

GENERAL STANDARDS
OF CONSTRUCTION
AND EQUIPMENT
FOR HOSPITAL AND
MEDICAL FACILITIES

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
Health Services and Mental Health Administration

□ *Health Facilities Planning and Construction Service*
Office of Architecture and Engineering
Silver Spring, Md. 20910

CONTENTS

FOREWORD	iii
1 INTRODUCTION	1
2 SITE	1
2-1 Location	1
2-2 Roads and parking	1
3 SITE SURVEY	1
3-1 General	1
3-2 Special considerations	1
4 SUBSOIL INVESTIGATION	2
4-1 General	2
4-2 Special considerations	2
5 EQUIPMENT	3
5-1 General	3
5-2 Classification	3
5-3 Applicant's responsibility	3
6 PLANS, SPECIFICATIONS, AND ESTIMATES	3
6-1 First stage - program and schematics	3
6-2 Second stage - preliminaries	4
6-3 Third stage - contract documents	4
6-4 Additions and alterations	7
6-5 Record drawings and manuals	7
✓ 7 CODES AND STANDARDS	7
7-1 General	7
7-2 List of referenced codes and standards	7
7-3 Availability of codes and standards listed	8
8 GENERAL HOSPITAL	9
8-1 Special considerations	9
8-2 Nursing unit	9
8-3 Newborn nursery unit	10
8-4 Pediatric unit	10
8-5 Psychiatric unit	11
8-6 Surgical suite	11
8-7 Obstetrical suite	12
8-8 Outpatient suite	12
8-9 Radiology suite	13
8-10 Laboratory suite	13
8-11 Pharmacy or drug room	13
8-12 Dietary department	13
8-13 Administration department	13
8-14 Medical records unit	14
8-15 Central medical and surgical supply department	14
8-16 Laundry	14
8-17 Central stores	14
8-18 Employees' facilities	14
8-19 Engineering service and equipment areas	14

CONTENTS (CON.)

8-20	Details and finishes	15
8-21	Elevators	17
8-22	Construction including fire-resistive requirements	17
8-23	Mechanical requirements	18
8-24	Electrical requirements	22
9	FACILITY FOR LONG-TERM CARE--NURSING HOMES AND CHRONIC DISEASE HOSPITALS	26
9-1	Special considerations	26
9-2	Nursing unit	26
9-3	Patients' dining and recreation areas	27
9-4	Physical therapy unit	27
9-5	Occupational therapy unit	27
9-6	Personal care room	28
9-7	Dietary department	28
9-8	Administration department	28
9-9	Laundry	28
9-10	Central storage room(s)	29
9-11	Locker rooms	29
9-12	Engineering service and equipment areas	29
9-13	Additional elements for chronic disease hospitals	29
9-14	Details and finishes	29
9-15	Elevators	31
9-16	Construction including fire-resistive requirements	32
9-17	Mechanical requirements	33
9-18	Electrical requirements	36
10	NURSES' RESIDENCE	39
11	PUBLIC HEALTH CENTER	39
12	STATE PUBLIC HEALTH LABORATORY	40
13	DIAGNOSTIC OR TREATMENT CENTER	42
14	REHABILITATION FACILITY (General)	44
15	REHABILITATION FACILITIES (Multiple Disability) IN A HOSPITAL	44
16	SEPARATE REHABILITATION FACILITY (Multiple Disability) FOR INPATIENTS AND OUTPATIENTS	46
17	SEPARATE REHABILITATION FACILITY (Multiple Disability) FOR OUTPATIENTS ONLY	49
18	SINGLE DISABILITY REHABILITATION FACILITY	50

Tables

1. Sound transmission limitations for partitions and floors in general hospitals	16
2. Pressure relationships and ventilation of certain hospital areas	20
3. Sound transmission limitations for partitions and floors in long-term care facilities	31
4. Pressure relationships and ventilation of certain nursing home areas	34

1 INTRODUCTION

The standards set forth herein have been established by the Surgeon General of the U.S. Public Health Service in accordance with the requirements of Title VI of the Public Health Service Act. These standards constitute minimum requirements for construction and equipment and shall apply to all projects for which Federal assistance is requested under the act. They are considered necessary to ensure properly planned and well constructed medical facilities which can be efficiently maintained and operated to furnish adequate services.

In the case of hospitals not specifically discussed herein such as tuberculosis hospitals, the standards for general hospitals will apply with nec-

essary modifications for special or unusual requirements.

General standards of construction and equipment are only minimum Public Health Service requirements. However, various guide materials and recommendations on planning various departments in a hospital are also available from the Public Health Service. Because of local conditions, States may have additional requirements, some of which may exceed those detailed herein. Neither these general standards nor the guide materials of the Public Health Service are intended in any way to restrict design initiative or construction techniques.

2 SITE

2-1 LOCATION

A. The site of any medical facility shall be accessible to the center of community activities.

B. Facilities shall be located in relation to the center of population, close to where competent medical and surgical consultation is readily available, and where employees can be recruited and retained.

C. The site shall be away from nuisances detrimental to the proposed project's program, such as

commercial or industrial developments, or other types of facilities that produce noise or air pollution.

2-2 ROADS AND PARKING

A. Roads and walks shall be provided within the lot lines to the main entrance, ambulance entrance, community activities, and services, including loading and unloading space for delivery trucks.

B. Off-street parking shall be provided unless public transportation or public parking facilities are available.

3 SITE SURVEY

3-1 GENERAL

The applicant shall provide for a survey of the site. The purpose of this survey is to obtain all information necessary for the development of the site and for making the mechanical and electrical service connections to the building. If any existing structures or improvements on the site are to be removed by the owners or others, the buildings or improvements must be so designated on the survey drawing. The survey and the recorded legal description shall be in agreement.

3-2 SPECIAL CONSIDERATIONS

The survey drawing shall show:

A. The courses and distances of property lines of all parcels which comprise the hospital site.

B. Dimensions and location of any buildings, structures, easements, rights of way, or encroachments on the site, and the presence of any undeveloped mineral rights to which the site is subject.

C. Details of party walls, or walls and foundations adjacent to the lot lines.

D. The position, dimensions, and elevations of all cellars, excavations, wells, back-filled areas, and similar existing openings, and the elevation of any water therein.

E. All trees which may be affected by the building operations.

F. Detailed information relative to established curb and building lines and street, alley, sidewalk, and curb grades at or adjacent to the site and the materials of which they are constructed.

G. Floor elevations shall be indicated for all existing buildings which are to be modernized or to which additions will be constructed.

H. All utility services including pipe sizes, pressures, and electrical characteristics.

I. The location and invert elevations of all piping, mains, sewers, poles, wires, hydrants, and man-

holes, upon, over, or under the site, or adjacent to the site, if within the limits of the survey.

J. The probability of freshets overrunning the site shall be investigated.

K. Official datum upon which elevations are based and a bench mark established on or adjacent to the site.

L. Elevation on a grid system of not more than 20'0" intervals to indicate changes of slope over that portion of the site to be developed.

M. Elevations of contours and bottoms of excavations.

N. Contemplated date and description of any proposed improvements to approaches or utilities adjacent to the site.

O. Certification on the survey drawing by the city engineer or other qualified official that the officially established street lines, grades of curbs, sidewalks, and sewers are correctly given.

4 SUBSOIL INVESTIGATION

4-1 GENERAL

An investigation shall be made to determine the subsurface soil and water conditions. The investigation shall include a sufficient number of test pits or test borings to determine in the judgment of the architect and the structural engineer the true subsurface conditions. Results of the investigation shall be submitted in the form of a soil investigation report or foundation engineering report. The investigation shall be made in close cooperation with the architect and structural engineer and shall contain detailed recommendations for foundation design and gradings.

4-2 SPECIAL CONSIDERATIONS

The following is a general outline of the suggested scope of soil investigation:

A. The borings or test pits shall extend into stable soils well below the bottom of any proposed foundations. A field log of the borings shall be made and the thickness, consistency, and character of each layer recorded.

B. The amount and elevation of ground water encountered in each pit or boring and its probable variation with the seasons and effect on the subsoil shall be determined. High and low water levels of nearby bodies of water affecting the ground water level shall also be determined.

C. Appropriate laboratory tests shall be performed to determine the safe-bearing value and compressibility characteristics of the various strata encountered in each pit or boring.

D. Maximum depth of frost penetration below surface of the ground shall be recorded.

E. Tests shall be made to determine whether the soil contains alkali in sufficient quantities to affect concrete foundations.

F. Corrosivity tests shall be made to determine whether the soil will adversely attack underground metallic conduits.

G. If the site is underlaid with mines, or if old workings are located in the vicinity, the elevation and location of the top of workings shall be determined.

5 EQUIPMENT

5-1 GENERAL

Provide all equipment necessary for the operation of the facility as planned. Consumable items, disposable items, and items of current operating expense such as fuel, food, and drugs are considered supplies and shall not be included in the equipment list required in sec. 5-3C.

5-2 CLASSIFICATION

Equipment items shall be classified in two main groups:

A. Fixed equipment is defined as equipment which is permanently affixed to the building or which must be connected to a service distribution system designed and installed during construction for the specific use of the equipment. It includes items such as extractors, walk-in refrigerators, intercommunication systems, and built-in casework.

B. Movable equipment is defined as all items of equipment which are not considered to be fixed equipment. It includes items such as operating tables, obstetrical tables, anesthesia apparatus, wheeled equipment, portable paging systems, chinaware, and surgical instruments.

5-3 APPLICANT'S RESPONSIBILITY

A. It shall be the responsibility of the applicant to select and purchase all necessary equipment for the complete functioning of all services included in the project in accordance with these standards.

B. Fixed equipment not included in the construction contract shall be selected and shown on the preliminary stage of the plans (second stage) to ensure its coordination with the architectural, mechanical, and electrical phases of the work.

C. As soon as possible after the award of the construction contract, the applicant shall submit to the Surgeon General for approval, through the State agency, in triplicate, a complete list with an itemized estimate of cost of all proposed fixed equipment not included in the construction contract and all movable equipment.

D. Applicants who do not include all fixed equipment in the construction contract and let separate contracts for furnishing and installing certain items of fixed equipment must include in such separate contracts all provisions for contract security, insurance, and compliance with labor standards as provided under sec. 6-3B, except that labor standards need not be included for contracts under \$2000.

6 PLANS, SPECIFICATIONS, AND ESTIMATES

Plans, specifications, and estimates shall be submitted in three stages as follows:

6-1 FIRST STAGE— PROGRAM AND SCHEMATICS

A. Program

1. List in outline form the rooms or spaces to be included in each department, explaining the functions or services to be provided in each, indicating the approximate size, the number of personnel, and the kind of equipment or furniture it will contain. Note any special or unusual services or equipment to be included in the facility.

2. For inpatient facilities, submit a schedule showing total number of beds; type of rooms (such

as single- and two-bed rooms); distribution of services (such as medicine and surgery).

3. Give an outline of construction materials.

4. Submit preliminary cost estimates.

B. Schematic Plans

1. Single line drawings of each floor shall show the relationship of the various departments or services to each other and the room arrangement in each department. The name of each room shall be noted. The proposed roads and walks, service and entrance courts, parking and orientation may be shown on either a small plot plan or the first-floor plan. A simple vertical space diagram shall be submitted at this stage.

2. If the project is an addition, or is otherwise related to existing buildings on the site, the plans shall show the facilities and general arrangement of those buildings.

C. Description of Site

1. The site shall be described by means of the survey drawing and soil investigation report, or by means of an outline description containing the following general characteristics of the site:

- a. Easements.
- b. Availability of electricity, water, and sewer lines.
- c. Main roadway approaches.
- d. Direction of prevailing breezes.
- e. Orientation.

2. A map shall be submitted indicating location of the hospital in its geographic area with particular reference to requirements given under sec. 2.

D. Certification. A certification from the State Health Department (or other authorized State agency) that the proposed water supply is potable.

6-2 SECOND STAGE—PRELIMINARIES

A. Plans. Preliminary sketch plans shall include the following:

1. Architectural

- a. Plans of basement, floors, and roof showing space assignment, sizes, and outline of fixed and movable equipment.
- b. All elevations and typical sections.
- c. Plot plan showing roads, parking, and side-walks.
- d. Areas and bed capacities by floors.

2. Mechanical

- a. Single line layouts of all duct and piping systems.
- b. Riser diagrams for multistory construction.
- c. Scale layout of boilers and major associated equipment and central heating, cooling, and ventilating units.

3. Electrical

- a. Plans showing space assignment, sizes and outline of fixed equipment such as transformers, main switch and switchboards, and generator sets.

- b. Simple riser diagram for multistory building construction, showing arrangement of feeders, subfeeders, bus work, load centers, and branch circuit panels.

B. Outline Specifications

1. General description of the construction, including interior finishes, types and locations of acoustical material, and special floor covering.

2. Description of the air-conditioning, heating, and ventilation systems and their controls; duct and piping systems; and dietary, laundry, sterilizing, and other special equipment.

3. General description of electrical service including voltage, number of feeders, and whether feeders are overhead or underground.

C. Description of the Site. The survey drawing and the soil investigation report shall be submitted at this time if these items were not included with the first stage submittal.

D. Revised Cost Estimates

6-3 THIRD STAGE—CONTRACT DOCUMENTS

A. Working Drawings. Working drawings shall be complete and adequate for bid, contract, and construction purposes. Drawings shall be prepared for each of the following branches of the work: architectural, structural, mechanical, and electrical. They shall include the following:

1. Architectural drawings

- a. Approach plan showing all new topography, newly established levels and grades, existing structures on the site (if any), new buildings and structures, roadways, walks, and the extent of the areas to be seeded. All structures and improvements which are to be removed under the construction contract shall be shown. A print of the site survey drawing shall be included with the working drawings for the information of bidders only. However, the survey drawing need not be made a part of the contract documents.
- b. Plan of each basement, floor, and roof.
- c. Elevations of each facade.
- d. Sections through building.
- e. Required scale and full-size details.
- f. Schedule of doors and finishes.

- g. Equipment. Location of all fixed equipment. Layout of typical and special rooms indicating all fixed equipment and major items of movable equipment. Equipment not included in the contract shall be so indicated.
 - h. Conveying systems. Details of construction, size and type of equipment, length and route of travel, machine and control spaces necessary, and utility requirements, for the following:
 - (1) Conveyors--gravity, and power driven.
 - (2) Cranes.
 - (3) Dumbwaiters--electric, hand, hydraulic.
 - (4) Elevators--freight, passenger, patient.
 - (5) Hoists--electric, hand, hydraulic, pneumatic.
 - (6) Loading dock devices.
 - (7) Material handling systems.
 - (8) Pneumatic tube systems.
 - (9) Stairs, moving.
2. Structural drawings
- a. Plans for foundations, floors, roofs, and all intermediate levels with sizes, sections, and the relative location of the various structural members.
 - b. Schedule of beams, girders, and columns.
 - c. Dimensions between floor levels, column centers, and offsets.
 - d. Dimensions of special openings and pipe sleeves.
 - e. Details of all special connections, assemblies, and expansion joints.
 - f. For special structures, a stress sheet showing:
 - (1) Outline of the structure.
 - (2) All load assumptions.
 - (3) Stresses and bending moments separately for each kind of loading.
 - (4) Maximum stress and/or bending moment for which each member is designed, when not readily apparent from (3).
 - (5) Horizontal and vertical reactions at column bases.
3. Mechanical drawings
- a. Heating, steam piping, and air-conditioning systems.
 - (1) Radiators and steam heated equipment such as sterilizers, warmers, and steam tables.
 - (2) Heating and steam mains and branches with pipe sizes.
 - (3) Diagram of heating and steam risers with pipe sizes.
 - (4) Sizes, types, and heating surfaces of boilers, furnaces, with stokers and oil burners, if any.
 - (5) Pumps, tanks, boiler breeching, and piping and boiler room accessories.
 - (6) Air-conditioning systems with required equipment, water and refrigerant piping, and ducts.
 - (7) Supply and exhaust ventilating systems with steam connections and piping.
 - (8) Air quantities for all room supply and exhaust ventilating duct openings.
 - b. Plumbing, drainage, and standpipe systems.
 - (1) Size and elevation of: street sewer, house sewer, house drains, street water main, and water service into the building.
 - (2) Location and size of soil, waste, and vent stacks with connections to house drains, clean-outs, fixtures, and equipment.
 - (3) Size and location of hot, cold, and circulating mains, branches, and risers from the service entrance, and tanks.
 - (4) Riser diagram of all plumbing stacks with vents, water risers, and fixture connections.
 - (5) Gas, oxygen, and special connections.
 - (6) Standpipe and sprinkler systems.
 - (7) All fixtures and equipment that require water and drain connections.
4. Electrical drawings
- a. Electric service entrance with switches and feeders to the public service feeders, characteristics of the light and power current, transformers and their connections if located in the building.
 - b. Location of main switchboard, power panels, light panels, and equipment. Diagram of feeders and conduits with schedule of feeder breakers or switches.
 - c. Light outlets, receptacles, switches, power outlets, and circuits.
 - d. Telephone layout showing service entrance, telephone switchboard, strip boxes, telephone outlets, and branch conduits.
 - e. Nurses' call systems with outlets for beds, duty stations, door signal lights, annunciators, and wiring diagrams.

PLANS, SPECIFICATIONS, AND ESTIMATES
Section 6-3

- f. Fire alarm system with stations, signal devices, control board, and wiring diagrams.
 - g. Emergency electrical system with outlets, transfer switch, sources of supply, feeders, and circuits.
 - h. All other electrically operated systems and equipment.
- B. Specifications. Specifications shall supplement the drawings to fully describe types, sizes, capacities, workmanship, finishes, and other characteristics of all materials and equipment and shall include:
- 1. Cover or title sheet.
 - 2. Index.
 - 3. Instruction to bidders.
 - 4. Bid form.
 - 5. Form of agreement.
 - 6. Performance and payment bond forms.
 - 7. Labor Standards Provisions for Construction Grant Programs.
 - 8. Sections describing materials and workmanship in detail for each class of work.
 - 9. Special conditions.
 - 10. General conditions that contain the following requirements:
 - a. Access to the work. Representatives of the Surgeon General and State agency will have access at all reasonable times to work wherever it is in preparation or progress, and the contractor shall provide proper facilities for such access and inspection.
 - b. Contract security. The successful bidder must deliver to the owner executed Performance and Payment Bonds each in an amount equal to 100% of the accepted bid. Separate bonds are preferred; however, a single bond providing the above coverage will be acceptable.
 - c. Bodily injury and property damage liability insurance. The contractor must carry liability insurance for bodily injury and property damage in amounts not less than listed below:

Contractor's Protective Liability Insurance

Bodily Injury Liability	\$300,000 - \$500,000
Property Damage	100,000 - 300,000

Owner's Protective Liability Insurance

Bodily Injury Liability	\$300,000 - \$500,000
Property Damage	100,000 - 300,000

- d. Fire insurance. The contractor (or owner) shall insure the building or buildings or other work included in the contract against loss or damage by fire, and against loss or damage covered by the standard extended coverage insurance endorsement, the amount of which shall at all times be at least equal to the amount paid on the account of work and materials plus the value of work or of materials furnished or delivered but not yet paid for by the owner. The policy shall provide for the inclusion of the name of all other contractors, subcontractors, and others employed on the premises as insureds, and shall stipulate that the insurance companies shall have no right of subrogation against any contractors, subcontractors, or other parties employed on the premises, for any work of any nature whatsoever.
- e. Specifying of materials and equipment. The following paragraph shall appear at the beginning of each Division or Section of the Specifications:

"Notwithstanding any reference in the specifications to any article, device, product, material, fixture, form or type of construction by name, make, or catalog number, such references shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; and the contractor, in such cases, may at his option use any article, device, product, material, fixture, form or type of construction which in the judgment of the architect expressed in writing is equal to that specified."

- C. Estimates. Show in convenient form and detail the probable total cost of the work to be performed under the contract and fixed equipment contemplated by plans and specifications.

6-4 ADDITIONS AND ALTERATIONS

Plans and specifications for projects involving additions or alterations shall indicate the construction phasing necessary to minimize disruptions of existing hospital operations. Safety requirements for projects involving work in existing buildings shall be the same as those required for new construction.

6-5 RECORD DRAWINGS AND MANUALS

A. Upon completion of the contract, the contractors shall deliver to the owner a complete set of legible drawings showing all construction, equipment, mechanical and electrical systems, and connections as installed or built.

B. The contractor shall deliver to the owner a complete set of equipment installation and maintenance manuals.

7 CODES AND STANDARDS

7-1 GENERAL

Nothing stated herein shall relieve the sponsor from compliance with building codes, ordinances, and regulations which are enforced by city, county, or State jurisdictions. Where such codes, ordinances, and regulations are not in effect, it shall be the responsibility of the sponsor to consult one of the national building codes generally used in the area for all components of the building type which are not specifically covered by the minimum standards set forth herein provided the requirements of the code are not inconsistent with the minimum standards herein.

7-2 LIST OF REFERENCED CODES AND STANDARDS

The following codes and standards have been utilized in whole or in part as references in the sections of this publication in parenthesis:

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Handbook of Fundamentals (secs. 8-23C1, 8-24J4c, 9-17C1, and 9-18H4c) \$15.00

American Society for Testing and Materials (ASTM) Standard No. E 84-61, Method of Test for Surface Burning Characteristics of Building Materials (secs. 8-22E and 9-16E) \$1.00

American Society for Testing and Materials (ASTM) Standard No. E 90-66T, Recommended Practice for Laboratory Measurement of Airborne Sound Transmission Loss of Building Floors and Walls (Tentative) (secs. 8-20A15, table 1 and 9-14A19, table 3) \$1.00

American Society for Testing and Materials (ASTM) Standard No. E 119, Methods of Fire Tests of Building Construction and Materials (secs. 8-22D and 9-16D) \$1.00

Federal Housing Administration (FHA) Publication No. 750, Impact Noise Control in Multi-family Dwellings (secs. 8-20A15, table 1 and 9-14A19, table 3) 50 cents

International Standards Organization (ISO) Recommendations No. 140-1960, Field and Laboratory Measurements of Airborne and Impact Sound Transmission (secs. 8-20A15, table 1 and 9-14A19, table 3) \$2.40

National Bureau of Standards (NBS) Handbook 73, Protection Against Radiation from Sealed Gamma Sources (secs. 8-20A11b and 9-14A15b) 30 cents

National Bureau of Standards (NBS) Handbook 76, Medical X-ray Protection up to Three Million Volts (secs. 8-20A11a and 9-14A15a) 25 cents

National Electrical Manufacturers Association (NEMA) Bulletin No. XR4-10, Minimum Power Supply Requirements (sec. 8-24G2) No charge

National Fire Protection Association (NFPA) Standard No. 70, National Electrical Code (sec. 8-24G2) \$1.00

National Fire Protection Association (NFPA) Standard No. 56, Code for the Use of Flammable Anesthetics (secs. 8-20B2, 8-23D2s, 8-24F1 and G1, and 9-14B2) 75 cents

CODES AND STANDARDS
Section 7-2

National Fire Protection Association (NFPA)
Standard No. 82, Standard for Incinerators
(secs. 8-23B and 9-17B) 50 cents

National Fire Protection Association (NFPA)
Standard No. 10, Standards for the Installation
of Portable Fire Extinguishers (secs. 8-20A14
and 9-14A18) 60 cents

National Fire Protection Association (NFPA)
Standard No. 101, Life Safety Code (secs.
8-20A1 and 9-14A1) \$1.50

National Fire Protection Association (NFPA)
Standard No. 565, Standard for Nonflammable
Medical Gas Systems (secs. 8-23E6 and 9-
17E6) 50 cents

Public Health Service (PHS) Publication, Labor
Standards Provisions for Construction Grant
Programs (sec. 6-3B7) (Available only at no
charge from the Division of Hospital and Med-
ical Facilities, Willste Building, Silver Spring,
Maryland 20910)

Public Health Service (PHS) Publication No. 934,
Food Service Sanitation Manual (secs. 8-12
and 9-7) 55 cents

Public Health Service (PHS) Publication No. 1038,
Report of Public Health Service Technical Com-
mittee on Plumbing Standards (secs. 8-23E and
9-17E) 45 cents

Underwriters' Laboratories, Inc. (UL) Publi-
cation No. 181, Air Ducts (secs. 8-23D2j and
9-17D2h) No charge

United States of America Standards Institute
(USASI) Standard No. A117.1-1961, American
Standard Specifications for Making Buildings
and Facilities Accessible to, and Usable by,
the Physically Handicapped (secs. 8-1B and
9-1B) \$2.00

American Society of Heating, Refrigerating and
Air-Conditioning Engineers
United Engineer Center
345 East 47th Street
New York, New York 10017

American Society for Testing and Materials
1916 Race Street
Philadelphia, Pennsylvania 19103

International Standards Organization
(USA Headquarters, United States of America
Standards Institute)
10 East 40th Street
New York, New York 10016

National Electrical Manufacturers Association
155 East 44th Street
New York, New York 10017

National Fire Protection Association
60 Batterymarch Street
Boston, Massachusetts 02110

Underwriters' Laboratories, Inc.
207 East Ohio Street
Chicago, Illinois 60611

United States of America Standards Institute
(Formerly American Standards
Association, Inc.)
10 East 40th Street
New York, New York 10016

Except as noted in the list, copies of Govern-
ment publications can be purchased from the
Superintendent of Documents, U.S. Government
Printing Office, Washington, D.C. 20402.

7-3 AVAILABILITY OF CODES
AND STANDARDS LISTED

Copies of non-Government publications can be
obtained from the various agencies at the addresses
listed in the next column.

8 GENERAL HOSPITAL

NOTE: General hospitals shall either contain the elements described herein or the narrative program accompanying the application shall indicate the manner in which the needed services are to be available to the hospital. When services are to be shared or purchased, appropriate modifications or deletions in space requirements would be anticipated. When pediatric, psychiatric, and obstetrical services are not included in the hospital, the narrative program should indicate where such services are available in the community. Each element provided in the hospital must meet the construction requirements outlined herein.

8-1 SPECIAL CONSIDERATIONS

A. Hospitals with a capacity of 50 beds or less present special problems. The sizes of the various departments will depend upon the requirements of the hospital. Some functions allotted separate spaces or rooms in these general standards may be combined provided that the resulting plan will not compromise the best standards of safety and of medical and nursing practices. In other respects, the general standards set forth in this publication, including the area requirements, shall apply.

B. Facilities shall be available to the public, staff, and patients who may be physically handicapped. Minimum requirements except as noted in these standards shall be those set forth in USASI Pub. No. A117.1-1961.

8-2 NURSING UNIT

A. Patient Rooms. Each patient room shall meet the following requirements:

1. Maximum room capacity: 4 patients.
2. Minimum room areas exclusive of toilet rooms, closets, lockers, wardrobes, or vestibules: 100 square feet in one-bed rooms and 80 square feet per bed in multibed rooms.
3. Multibed rooms shall be designed to permit no more than two beds side by side parallel to the window wall.
4. Window: sill shall not be higher than 3'0" above the floor and shall be above grade.
5. Nurses' calling stations. (see sec. 8-24H)
6. Lavatory. In single and two-bed rooms, the lavatory may be located in a private toilet room.

7. Locker or closet for each patient.

8. Cubicle curtains, or equivalent built-in devices, for privacy for each patient in multibed rooms.

9. No patient room shall be located more than 120'0" from the nurses' station, the clean workroom, and the soiled workroom.

B. Service Areas in Each Nursing Unit. The size of each service area will depend on the number and types of beds within the unit and include:

1. Nurses' station. For nurses' charting, doctors' charting, communications, and storage for supplies and nurses' personal effects.
2. Nurses' toilet room. Convenient to nurses' station.
3. Nurses' office. Near nurses' station. (Office may serve more than one nursing unit.)
4. Clean workroom. For storage and assembly of supplies for nursing procedures; shall contain work counter and sink.
5. Soiled workroom. Shall contain clinical sink, work counter, waste receptacle, and soiled linen receptacles.
6. Medicine room. Adjacent to nurses' station; with sink, refrigerator, locked storage, and facilities for preparation and dispensing of medication. (May be a designated area within clean workroom if a self-contained cabinet is provided.)
7. Clean linen storage. Enclosed storage space. (May be a designated area within the clean workroom.)
8. Nourishment station. Storage and sink for serving between-meal nourishments. (May serve more than one nursing unit.)

GENERAL HOSPITAL
Section 8-2

9. Equipment storage room. For storage of IV stands, inhalators, air mattresses, walkers, and similar bulky equipment.
10. Patient baths. One shower stall or one bathtub for each 15 beds not individually served.
11. Stretcher and wheelchair parking area or alcove.
12. Janitor's closet. Storage of housekeeping supplies and equipment; floor receptor or service sink.

C. Patient Toilet Rooms. A toilet room shall be directly accessible from each patient room without going through the general corridor. One toilet room may serve 2 patient rooms but not more than 4 beds. (The lavatory may be omitted from the toilet room if one is provided in each patient room.)

D. Isolation Room. Isolation room(s) for the particular use of those prone to infections as well as those suffering from infections shall be provided on the basis of one for each 30 beds or major fraction thereof, if the hospital does not have a separate contagious disease unit. Each isolation room shall have:

1. Only one patient per room.
2. Lavatory within patient room or toilet room.
3. View-window for nursing observation.
4. Separate toilet room with bath or shower.
5. An anteroom with adequate facilities to maintain aseptic conditions, including lavatory or sink. (One anteroom may serve several isolation rooms.)

E. Disturbed Patient Room. In the absence of a psychiatric unit, each hospital shall have a room which shall be designed in a manner to permit use as an ordinary patient room and which will also contain facilities to care for patients needing close supervision including facilities to prevent the patient's escape, suicide, or hiding. To minimize patient injury, the design of the room shall exclude sharp projections. An individual toilet room with lavatory shall be provided. The toilet room door shall be lockable only from the outside.

8-3 NEWBORN NURSERY UNIT

A. General. Each nursery shall provide:

1. Lavatory.

2. Emergency nurses' call.
3. Oxygen.
4. Facilities for viewing the babies.

B. Full-Term Nursery. Each room shall contain not more than 12 bassinets with a minimum area of 24 square feet per bassinet. An examination and workroom shall be provided. (One examination and workroom may serve up to 24 bassinets.)

C. Premature Nursery. A premature nursery is required only for hospitals with 25 or more maternity beds. Each nursery shall contain no more than 6 bassinets with a minimum area of 30 square feet per bassinet. The premature nursery shall have its own workroom including lavatory. (A work area within the premature nursery may be used but this area shall be in addition to the required bassinet area.)

D. Formula Room. This room is intended for the sole purpose of preparing the infant formula and shall have no direct access to the nursery or workroom. It may be located elsewhere in the hospital. The following shall be provided unless commercially-prepared formula is used:

1. Work counter with built-in sink with gooseneck-type spout and knee or foot control.
2. Lavatory.
3. Hot plate.
4. Refrigerator.
5. Sterilizer (autoclave).
6. Bottle washer.

If commercially prepared formula is to be used or other modifications are proposed in formula preparation and processing, the formula room shall include such space and equipment as are necessary to accommodate formula processing, handling, and storage requirements.

E. Janitor's Closet. This closet shall contain floor receptor or service sink and space for supplies and cleaning equipment.

8-4 PEDIATRIC UNIT

If provided as a separate nursing unit, it shall contain:

A. Patient Rooms. Pediatric patient rooms shall conform to the same requirements as those for a patient room shown in sec. 8-2A. In addition, an allowance of 40 square feet per bassinet must be provided in nurseries.

B. Service Areas. These areas shall conform to the requirements in sec. 8-2B, and shall include:

1. Treatment room. Lavatory.
2. Dining, education, and playroom. Multiuse area for 50 percent of the patients.
3. Toilet room. For each sex, with minimum ratio of 1 water closet for each 8 beds excluding bassinets.
4. Storage. For clothes, toys, and equipment.

8-5 PSYCHIATRIC UNIT

If included as a separate nursing unit, it should be designed as other nursing units except that care must be taken to provide for patients needing close supervision to prevent the patient's escape, suicide, or hiding. The unit shall contain:

A. Patient Room. Each patient room shall meet the following requirements:

1. Minimum room areas; 100 square feet in one-bed rooms and 80 square feet per bed in multibed rooms.
2. Private toilet room.
3. Window: Sill height shall not be higher than 3'0" above the floor and shall be above grade.

B. Service Areas. These areas shall conform to the requirements in sec. 8-2B, and shall include:

1. Doctors' office.
2. Examination and treatment room.
3. Conference room.
4. Dining room; minimum of 15 square feet per person seated.
5. Dayroom; minimum of 40 square feet per patient.

6. Storage for recreation and occupational therapy equipment.

7. Storage for patients' belongings.

8-6 SURGICAL SUITE

A. General. The suite shall be located to prevent through traffic. (See secs. 8-20 and 8-24 for special requirements.)

B. Operating Rooms. One operating room shall be provided for each 50 beds or major fraction thereof, except that for hospitals of over 200-bed capacity, the number of operating rooms shall be based on the expected surgical workload.

C. Cystoscopy Room. This room is required in a facility of over 150 beds. A convenient toilet room with lavatory must be provided. A scrub sink or large lavatory must be provided within or adjoining the cystoscopy room. (May be located in an area other than the surgical suite.)

D. Recovery Facilities. A separate room with charting space, medication storage and preparation space, and clinical sink is required. (May be omitted in hospitals with less than a minimum average of 10 surgical procedures per day.)

E. Service Areas in Each Surgical Suite. The size of each service area will depend on the surgical workload and shall include:

1. Surgical supervisor station.
2. Sterilizing facilities. Near operating room with hi-speed autoclave.
3. Facilities for storage and preparation of medication.
4. Scrubup facilities. Adjacent to operating rooms.
5. Soiled workroom. Shall contain counter, clinical sink, waste receptacle, and soiled linen receptacles.
6. Storage for sterile and unsterile supplies. (May be in clean workroom.)
7. Anesthesia workroom. For cleaning and storage of equipment.

GENERAL HOSPITAL
Section 8-6

8. Storage room for anesthetic agents.
9. Nitrous oxide and oxygen facilities. (Provide storage room if these services are not piped in.)
10. Clean workroom. For storage and assembly of supplies; shall contain counter and sink.
11. Equipment storage room. For surgical and monitoring equipment.
12. Janitor's closet. Floor receptor or service sink and storage for housekeeping supplies and equipment.
13. Clothing change areas, lockers, and toilet rooms. For doctors, nurses, orderlies, and other personnel.
14. Holding area (for patients) in facilities with two or more operating rooms.
15. Stretcher alcove.

8-7 OBSTETRICAL SUITE

A. General. The suite shall be located to prevent through traffic and shall be completely separated from the surgical suite. (See secs. 8-20 and 8-24, for special requirements.)

B. Delivery Room. The number required shall be based on the estimated annual birth rate.

C. Labor Room. The number required shall be based on the estimated annual birth rate. A patients' toilet room shall be provided adjoining each labor room or conveniently accessible.

D. Recovery Room. Shall contain a minimum of two beds; clinical sink; and medication storage and preparation. (May be omitted in hospitals with an annual birth rate of less than 800.)

E. Service Areas in Each Obstetrical Suite. The size of each service area will depend on the obstetrical workload and the suite shall include:

1. Supervisor's station.
2. Sterilizing facilities. Provide with high-speed autoclave. Locate near delivery rooms.
3. Facilities for storage and preparation of medication.

4. Scrubup facilities. Adjacent to delivery room.

5. Soiled workroom. Shall contain counter, clinical sink, waste receptacle, and soiled linen receptacles.

6. Storage for sterile and unsterile supplies. (May be in clean workroom.)

7. Anesthesia workroom. For cleaning and storage of equipment.

8. Storage room for anesthetic agents.

9. Nitrous oxide and oxygen facilities. (Provide storage room if these services are not piped in.)

10. Clean workroom. For storage and assembly of supplies; shall contain counter and sink.

11. Equipment storage room. For surgical and monitoring equipment.

12. Janitor's closet. Floor receptor or service sink and storage for housekeeping supplies and equipment.

13. Clothing change areas, lockers, and toilet rooms. For doctors, nurses, orderlies, and other personnel.

14. Stretcher alcove.

8-8 OUTPATIENT SUITE

These facilities shall be located to prevent outpatients from traversing inpatient areas and shall include:

A. Well-Marked and Sheltered Entry with nearby emergency parking and convenient access for ambulances.

B. Reception Area with telephone, drinking fountain, and toilet rooms.

C. Admissions and Patients' Records Area

D. Examination and Treatment Room(s). Laboratory.

E. Emergency Room. Clinical sink. (See secs. 8-20 and 8-24 for special requirements.)

F. Storage for Sterile Supplies

G. Wheelchair and Stretcher Alcove

H. Janitor's Closet. Floor receptor or service sink and storage for housekeeping supplies and equipment.

8-9 RADIOLOGY SUITE

This suite shall contain:

A. Radiographic Room. (See secs. 8-20 and 8-24 for special requirements.)

B. Film Processing Room

C. Film Filing Room

D. Toilet Room. Adjoining each fluoroscopy room.

E. Dressing Area. For ambulatory patients.

F. Holding Area. For stretcher patients.

G. Waiting Space

H. Office. With film viewing facilities.

8-10 LABORATORY SUITE

Facilities for the following services shall be provided: chemistry, bacteriology, serology, pathology, and hematology. They shall include:

A. Glasswashing and Sterilizing Facilities

B. Recording and Filing Facilities

C. Office

D. Blood Storage Room. (May be located in an area other than the laboratory suite.)

E. Specimen Collection Room. This room shall be located near the laboratory and contain a water closet and lavatory.

F. Morgue and Autopsy Facilities. These facilities shall be provided within the hospital unless otherwise available.

8-11 PHARMACY OR DRUG ROOM

8-12 DIETARY DEPARTMENT

Construction, equipment, and installation shall comply with or exceed the minimum standards set forth in the PHS Pub. No. 934. The department shall include the following facilities unless commercially prepared dietary service, meals, and/or disposables are to be used. If a commercial service will be used, dietary areas and equipment shall be designed to accommodate the requirements for sanitary storage, processing, and handling.

A. Food Preparation Center. Provide lavatory but do not provide mirror.

B. Food Serving Facilities. For patients and staff.

C. Dishwashing Room. Provide commercial-type dishwashing equipment and lavatory.

D. Potwashing Facilities

E. Refrigerated Storage. Three-day supply.

F. Day Storage. Three-day supply.

G. Cart Cleaning Facilities

H. Cart Storage Area

I. Waste Disposal Facilities

J. Canwashing Facilities

K. Dining Facilities. Provide 15 square feet per person seated.

L. Dietitian's Office

M. Janitor's Closet. Storage for housekeeping supplies and equipment; floor receptor or service sink.

N. Toilet Room. Conveniently accessible for dietary staff.

8-13 ADMINISTRATION DEPARTMENT

This department shall include:

A. Business Office

- B. Cashier's Station
- C. Information Center
- D. Administrator's Office
- E. Admitting Office
- F. Staff Lounge with Doctors' Coat Room
- G. Medical Library
- H. Lobby
- I. Public and Staff Toilet Rooms
- J. Director of Nurse's Office. (May be omitted in hospitals of less than 100 beds.)
- K. Housekeeper's Office or Space. (Location optional and may be combined with clean linen room in hospitals of less than 100 beds.)

8-14 MEDICAL RECORDS UNIT

This unit shall include:

- A. Active Record Storage Area
- B. Record Review and Dictating Room
- C. Work Area. For sorting, recording, or microfilming.
- D. Inactive Record Storage Area. (May be omitted if microfilming is used.)

8-15 CENTRAL MEDICAL AND SURGICAL SUPPLY DEPARTMENT

The following areas shall be separated from each other:

- A. Receiving and Cleanup Room. Space for cleaning equipment and disposing or processing of unclean articles shall be provided.
- B. Clean Workroom. This room shall be divided into work space, clean storage area, sterilizing facilities, and storage area for sterile supplies.
- C. Unsterile Supply Storage Area. (May be located in an area other than this department.)

8-16 LAUNDRY

The laundry shall include:

- A. Soiled Linen Room
- B. Clean Linen and Mending Room
- C. Linen Cart Storage
- D. Lavatories. Accessible from soiled, clean, and processing rooms.
- E. Laundry Processing Room. Commercial-type equipment shall be sufficient to take care of 7 days' needs within the workweek.
- F. Janitor's Closet. Storage for housekeeping supplies and equipment; floor receptor or service sink.
- G. Storage for Laundry Supplies

(Items E, F, and G need not be provided if laundry is processed outside the hospital.)

8-17 CENTRAL STORES

General storage room(s) shall have a total area of not less than 20 square feet per bed and shall be concentrated in one area.

8-18 EMPLOYEES' FACILITIES

These facilities shall include:

- A. Nurses' Locker Room. This room shall have lockers, rest space, and separate toilet room.
- B. Female Help Locker Room. This room shall have rest space, lockers, and separate toilet room.
- C. Male Help Locker Room. This room shall have lockers and separate toilet room.

8-19 ENGINEERING SERVICE AND EQUIPMENT AREAS

The following shall be provided:

- A. Boiler Room

B. Engineer's Office

C. Mechanical and Electrical Equipment Room(s)

D. Maintenance Shop(s). At least one room shall be provided.

E. Storage Room for Building Maintenance Supplies.

F. Storage Room for Housekeeping Equipment. (Need not be provided if space is available in janitor's closet elsewhere.)

G. Toilet and Shower Rooms

H. Refuse Room. For trash storage. Shall be located convenient to service entrance. (See sec. 8-20A9d.)

I. Incinerator Space. The incinerator shall be in a separate room, or in a designated area within the boiler room, or outdoors. (See sec. 8-23B.)

J. Yard Equipment Storage Room. For yard maintenance equipment and supplies.

8-20 DETAILS AND FINISHES

All details and finishes shall meet the following requirements:

A. Details

1. Exit facilities shall comply with the requirements for exit facilities listed in NFPA Standard No. 101. Minimum corridor widths shall be 8'0". Minimum width of doors to all rooms needing access for beds or stretchers shall be 3'8".

2. Such items as drinking fountains, telephone booths, and vending machines shall be located so that they do not project into the required width of exit corridors.

3. All doors to patient-room toilets or patient-room bathrooms shall be equipped with hardware which will permit access in any emergency.

4. All doors opening onto corridors shall be swing-type except elevator doors. Alcoves and similar spaces which generally do not require doors are excluded from this requirement.

5. No doors shall swing into the corridor except closet doors.

6. Thresholds and expansion joint covers, if used, shall be flush with the floor.

7. The location and arrangement of plumbing fixtures with blade handles intended for handwashing purposes shall provide clearance necessary for operation without use of hands. (See sec. 8-23 E1b.)

8. Paper towel dispensers shall be provided at all lavatories and sinks used for handwashing.

9. If linen and refuse chutes are used, they shall be designed as follows: (See also sec. 8-23B.)

- a. Service openings to chutes shall have approved class "B", 1 1/2-hour fire doors.
- b. Service openings to chutes shall be located in a room or closet of not less than 1-hour fire-resistive construction, and the entrance door to such room or closet shall be a class "C", 3/4-hour fire door.
- c. Minimum diameter of gravity-type chutes shall be 2'0".
- d. Chutes shall terminate in or discharge directly into a refuse room or linen chute room separate from the incinerator or laundry. Such rooms shall be of not less than 2-hour fire-resistive construction and the entrance door shall be a class "B", 1 1/2-hour fire door.
- e. Chutes shall extend at least 4'0" above the roof and shall be covered by a metal skylight glazed with thin plain glass.

10. Dumbwaiters, conveyors, and material handling systems shall not open into any corridor or exitway but shall open into a room enclosed by not less than 1-hour fire-resistive construction. The entrance door to such room shall be a class "C", 3/4-hour fire door.

11. Protection requirements of X-ray and gamma-ray installations shall conform to NBS Handbooks, as follows:

- a. X-ray--Handbook 76.
- b. Gamma-ray--Handbook 73.

12. Ceiling heights

- a. Boiler room. Not less than 2'6" above the main boiler header and connecting piping with a minimum height of 9'0".
- b. Operating rooms, delivery rooms, cystoscopic rooms, radiographic rooms, and rooms having ceiling-mounted surgical light fixtures. Not less than 9'0".

- c. Corridors, storage rooms, patients' toilet rooms, and other minor rooms. Not less than 7'6".
- d. All other rooms. Not less than 8'0".

13. Boiler rooms, food preparation centers, and laundries shall be insulated and ventilated to prevent any floor surface above from exceeding a temperature of 85°F.

14. Approved fire extinguishers shall be provided in recessed locations throughout the building in accordance with NFPA Standard No. 10.

15. Noise reduction criteria. Partition, floor, and ceiling construction in patient areas shall comply with table 1.

B. Finishes

1. For flame spread requirements, see sec. 8-22E.

2. Floors in anesthetizing areas and rooms used for storage of flammable anesthetic agents shall comply with NFPA Standard No. 56.

3. Floors generally shall be easily cleanable and shall have the wear resistance appropriate for the location involved. Floors in kitchens and related spaces shall be waterproof and greaseproof. In all areas where floors are subject to wetting, they shall have a nonslip finish.

4. Adjacent dissimilar floor materials shall be flush with each other to provide an unbroken surface.

5. Walls generally shall be washable and in the immediate area of plumbing fixtures, the finish shall be moistureproof. Wall bases in dietary areas shall be free of spaces that can harbor insects.

6. Wall bases in any areas used for surgical and obstetrical procedures shall be integral with either the wall or the floor surface material and shall be without voids that can harbor harmful bacteria.

7. All ceilings shall be washable or easily cleanable except that ceilings shall be washable in operating suites, delivery suites, dietary areas, and nurseries. This requirement does not apply to boiler rooms, mechanical and building equipment rooms, shops, and similar spaces.

8. Ceilings shall be acoustically treated in corridors in patient areas, nurses' stations, labor rooms, nourishment stations, dining areas, and dayrooms.

Table 1. SOUND TRANSMISSION LIMITATIONS
FOR PARTITIONS AND FLOORS IN
GENERAL HOSPITALS

Location	Airborne Sound Transmission Class (STC) <u>a/</u>		Impact Noise Rating (INR) <u>b/</u>
	Partitions	Floors	Floors
Patients' room to patients' room	45	45	-2
Corridor to patients' room	40	45	+5 <u>c/</u>
Public space to patients' room <u>d/</u>	50	50	+5 <u>c/</u>
Service areas to patients' room <u>e/</u>	55	55	+10 <u>c/</u>

a/ Sound transmission class (STC) shall be determined by tests in accordance with methods set forth in ASTM Standard E 90-66T.

b/ Impact noise rating (INR) shall be determined in accordance with criteria set forth in FHA Pub. No. 750. Tests shall be conducted in accordance with ISO Recommendations No. 140-1960.

c/ Impact noise limitation applicable only when corridor, public space, or service area is over patients' room.

d/ Public space includes lobbies, dining rooms, recreation rooms, treatment rooms, and similar spaces.

e/ Service areas include kitchens, elevators, elevator machine rooms, laundries, garages, maintenance rooms, boiler and mechanical equipment rooms, and similar spaces of high noise or vibration or both. Mechanical equipment located on the same floor or above patients' rooms, offices, nurses' stations, and similar occupied spaces shall be effectively isolated from such spaces with respect to noise and vibration.

NOTE: The requirements set forth in this table assume installation methods which will not appreciably reduce the efficiency of the assembly as tested. Location of electrical receptacles, grilles, ductwork, and other mechanical items, and blocking and sealing of partitions at floors and ceilings shall not compromise the sound isolation required.

8-21 ELEVATORS

A. Elevators, Where Required. All hospitals where either patients' beds or a critical facility, such as operating, delivery, diagnostic, recreation, patient dining, or therapy rooms are located on other than the first floor, shall have electric or electrohydraulic elevators as follows:

1. Number of elevators

- a. At least 1 hospital-type elevator shall be installed where 1 to 59 patient beds are located on any floor other than the first. (For purposes of these requirements, the first floor is that floor first reached from the main front entrance.)
- b. At least 2 hospital-type elevators shall be installed where 60 to 200 patient beds are located on floors other than the first, or where inpatient facilities are located on a floor other than that containing the patient beds.
- c. At least 3 hospital-type elevators shall be installed where 201 to 350 patient beds are located on floors other than the first, or where inpatient facilities are located on a floor other than that containing the patient beds.
- d. For hospitals with more than 350 beds, the number of elevators shall be determined from a study of the hospital plan and the estimated vertical transportation requirements.

2. Cars and platforms. Elevator cars and platforms shall be constructed of noncombustible material, except that fire-retardant-treated material may be used if all exterior surfaces of the car are covered with metal. Cars of hospital-type elevators shall have inside dimensions that will accommodate a patient's bed and attendants and shall be at least 5'0" wide by 7'6" deep. The car door shall have a clear opening of not less than 3'8".

3. Leveling. Elevators shall have automatic leveling of the two-way automatic maintaining type with accuracy within plus or minus 1/2 inch.

4. Operation. Elevators (except freight elevators) shall be equipped with two-way special service switch to permit cars to bypass all landing button calls and be dispatched directly to any floor.

B. Field Inspection and Tests. The contractor shall be required to cause inspections and tests to be made and shall deliver to the owner written certification that the installation meets the requirements set forth in this section and all pertinent safety requirements.

8-22 CONSTRUCTION INCLUDING FIRE-RESISTIVE REQUIREMENTS

A. Foundations shall rest on natural solid ground if a satisfactory soil is available at reasonable depths. Proper soil-bearing values shall be established in accordance with recognized standards. If solid ground is not encountered at practical depths, the structure shall be supported on driven piles or drilled piers designed to support the intended load without detrimental settlement, except that one-story buildings may rest on a fill designed by a soils engineer. When engineered fill is used, site preparation and all grading shall be done under the direct full-time supervision of the soils engineer. The soils engineer shall issue a final report on the grading operation and a certification of compliance with the job specifications. Special review and approval by the Public Health Service will be required for foundations supported on engineered fill. All footings shall extend to a depth not less than one foot below the estimated maximum frost line.

B. One-Story Buildings. One-story buildings shall be of not less than 1-hour fire-resistive construction throughout, with the following exceptions:

1. Walls enclosing stairways, elevator shafts, chutes and other vertical shafts, boiler rooms, and storage rooms of 100 square feet or greater area shall be of 2-hour fire-resistive construction.

2. Heavy timber construction may be used in gymnasiums, chapels, auditoriums, and administration areas provided that these areas are so located as to be freestanding buildings or if attached to the main building, are suitably fire separated therefrom, do not form a major circulation element in the facility, and do not serve as a required means of egress.

C. Multistory Buildings

1. For all buildings more than one story in height, the structural framework and building elements shall be an appropriately fire-resistive combination of materials using steel, concrete, or masonry. Load-bearing walls may be used only for exterior walls, fire walls, and vertical shafts.

2. Bearing walls and walls enclosing stairways, elevator shafts, chutes and other vertical shafts, boiler rooms, and storage rooms of 100 square

feet or greater area shall be of 2-hour fire-resistive construction.

3. Nonload-bearing corridor partitions shall be of 1-hour fire-resistive construction.

4. Columns, girders, trusses, floor construction including beams, and roof construction including beams shall be of not less than 1 1/2-hour fire-resistive construction.

5. Beams supporting masonry shall be individually protected with not less than 2-hour fire-resistive construction.

6. Nonload-bearing partitions other than corridor partitions shall be of 1-hour fire-resistive construction and may utilize fire-retardant-treated wood studs.

D. Fire-resistive ratings shall be determined in accordance with ASTM Standard No. E 119.

E. Interior finish of walls and ceilings of all exitways, storage rooms, and areas of unusual fire hazard shall have a flame spread rating of not more than 25; all other areas shall have a flame spread rating of not more than 75, except that up to 10 percent of the aggregate wall and ceiling area may have a finish with a rating up to 200. Floor finish materials shall have a flame spread rating of not more than 75. Flame spread ratings for each specific product shall be determined by an independent testing laboratory in accordance with ASTM Standard No. E 84-61.

8-23 MECHANICAL REQUIREMENTS

A. General

1. Prior to completion of the contract and final acceptance of the facility, the architect and/or engineer shall obtain from the contractor certification that all mechanical systems have been tested and that the installation and performance of these systems conform to the requirements of the plans and specifications.

2. Upon completion of the contract, the contractor shall furnish the owner with a bound volume containing operating instructions, manufacturers' catalog numbers, and description and parts list for each piece of equipment.

B. Incinerators and Refuse Chutes. Incinerators shall be gas-, electric-, or oil-fired and shall be capable of, but need not be limited to, the complete destruction of pathological wastes. Design and construction of incinerators and refuse chutes shall be in accordance with Part III of the NFPA Standard No. 82.

C. Steam and Hot Water Systems

1. Boilers. Boilers shall have the capacity, based upon the published Steel Boiler Institute or Institute of Boiler and Radiator Manufacturers' net rating, to supply the normal requirements of all systems and equipment. The number and arrangement of boilers shall be such that when one boiler breaks down or when routine maintenance requires that one boiler be temporarily taken out of service, the capacity of the remaining boiler(s) shall be sufficient to operate all systems. (In areas in a design temperature zone higher than +20°F., based on the Median of Extremes shown by the ASHRAE Handbook of Fundamentals, boiler capacity for space heating, when one boiler is out of service, will not be required.)

2. Boiler accessories. Boiler feed pumps, condensate return pumps, fuel oil pumps, and circulating pumps shall be connected and installed to provide standby service when any pump breaks down.

3. Valves. Supply and return mains and risers of space heating and process steam systems shall be valved to isolate the various sections of each system. Each piece of equipment shall be valved at the supply and return end.

4. Covering. Boilers, smoke breeching, steam supply piping, high pressure steam return piping, and hot water space heating supply and return piping shall be insulated with insulation having a flame spread rating of 25 or less and a smoke-developed rating of 50 or less.

D. Air Conditioning, Heating, and Ventilating Systems

1. Temperatures and humidities

- a. The systems shall be designed to provide the temperatures and humidities shown below.

<u>Area Designation</u>	<u>Temp. °F.</u>	<u>RH %</u>
Operating	70-76*	50-60
Delivery	70-76*	50-60
Recovery	75	50-60
Nursery (observation)	75	50
Nursery (full-term)	75	50
Nursery (premature)	75-80*	50-60*
Intensive care	70-80*	30-60

* Variable range required.

- b. For all other occupied areas, a minimum temperature of 75°F. shall be provided at winter design conditions.

2. Ventilation system details. All air-supply and air-exhaust systems shall be mechanically operated. All fans serving exhaust systems shall be located at the discharge end of the system. The ventilation rates shown on table 2 shall be considered as minimum acceptable rates and shall not be construed as precluding the use of higher ventilation rates if they are required to meet design conditions.

- a. Outdoor ventilation air intakes, other than for individual room units, shall be located as far away as practicable but not less than 25 feet from the exhausts from any ventilating system or combustion equipment. The bottom of outdoor intakes serving central air systems shall be located as high as possible but not less than 8 feet above the ground level or, if installed through the roof, 3 feet above roof level.
- b. The ventilation systems shall be designed and balanced to provide the general pressure relationship to adjacent areas shown in table 2.
- c. All air supplied to sensitive areas such as operating and delivery rooms and nurseries shall be delivered at or near the ceiling of the area served, and all air exhausted from the area shall be removed near floor level. At least two exhaust outlets shall be used in all operating and delivery rooms. Exhaust outlets shall be located not less than 3 inches above the floor.
- d. Room supply air inlets, recirculation, and exhaust air outlets installed in nonsensitive areas shall be located not less than 3 inches above the floor.
- e. Corridors shall not be used to supply air to or exhaust air from any room, except that exhaust air from corridors may be used to ventilate bathrooms, toilet rooms, or janitor's closets opening directly on corridors.
- f. Filters. The ventilation systems serving sensitive areas such as operating rooms, delivery rooms, nurseries, isolation rooms, and laboratory sterile rooms, and recirculated central air systems serving other hospital areas, shall be equipped with a minimum of 2 filter beds. Filter bed #1 shall be located upstream of the conditioning equipment and shall have a minimum efficiency of 30 percent. Filter bed #2 shall be located downstream of the conditioning equipment and

shall have a minimum efficiency of 90 percent.

Central systems using 100 percent outdoor air and serving other than sensitive areas, except as noted in Section 8-23D2n, shall be provided with filters rated at 80 percent efficiency.

The above filter efficiencies shall be warranted by the manufacturer and shall be based on the National Bureau of Standards Dust Spot Test Method with Atmospheric Dust.

The exhausts from all laboratory hoods in which infectious or radioactive materials are processed shall be equipped with filters having a 99 percent efficiency based on the DOP (dioctyl-phthalate) test method.

Filter frames shall be durable and carefully dimensioned, and shall provide an airtight fit with the enclosing ductwork. All joints between filter segments and the enclosing ductwork shall be gasketed or sealed to provide a positive seal against air leakage.

- g. A manometer shall be installed across each filter bed serving central air systems.
- h. Ducts shall be constructed of iron, steel, aluminum, or other approved metal or materials such as clay or asbestos cement.
- i. Ducts which penetrate construction intended for X-ray or other ray protection shall not impair the effectiveness of the protection.
- j. Duct linings shall meet the Erosion Test Method described in UL Pub. No. 181. Duct linings, coverings, vapor barriers, and the adhesives used for applying them shall have a flame spread classification of not more than 25 and a smoke-developed rating not more than 50.
- k. Acoustical lining materials shall not be used in the interior of duct systems serving sensitive areas such as operating and delivery rooms, nurseries, and isolation rooms.
- l. Ducts which pass through fire walls shall be provided with approved automatic fire doors on both sides of the wall except that 3/8-inch steel plates may be used in lieu of fire doors for openings not exceeding 1'6" in diameter. An approved fire damper shall be provided on each opening through each fire partition and on each opening through the walls of a vertical shaft. Ducts which pass through a required smoke barrier shall be provided with dampers which are actuated by products of combustion other than heat. Access for maintenance shall be provided at all dampers.

Table 2. PRESSURE RELATIONSHIPS AND VENTILATION OF CERTAIN HOSPITAL AREAS

Area Designation	Pressure Relationship to Adjacent Areas	All Supply Air From Outdoors	Minimum Air Changes of Out-door Air Per Hour	Minimum Total Air Changes Per Hour	Exhausted Directly to Outdoors	Recirculated Within Room
Operating room	+	--	5	12	--	No
Emergency operating room	+	--	5	12	--	No
Delivery room	+	--	5	12	--	No
Nursery	+	--	5	12	--	No
Recovery --	0	--	2	6	Yes	No
Intensive care	+	--	2	6	--	No
Patient room	0	--	2	2	--	--
Patient area corridor	0	--	2	4	--	--
Isolation room	0	--	2	6	Yes	No
Isolation anteroom	0	--	2	6	Yes	No
Treatment room	0	--	2	6	--	No
X-ray, fluoroscopy room	-	--	2	6	Yes	No
X-ray, treatment room	0	--	2	6	--	--
Physical therapy and hydrotherapy	-	--	2	6	--	--
Soiled workroom	-	--	2	4	--	No
Clean workroom	+	--	2	4	--	--
Autopsy and darkroom	-	--	2	12	Yes	No
Toilet room	-	--	--	10	Yes	No
Bedpan room	-	--	--	10	Yes	No
Bathroom	-	--	--	10	Yes	No
Janitor's closet	-	--	--	10	Yes	No
Sterilizer equipment room	-	--	--	10	Yes	No
Linen and trash chute rooms	-	--	--	10	Yes	No
Laboratory, general ¹	-	--	2	6	--	--
Laboratory, media transfer ²	+	--	2	4	--	No
Food preparation centers ³	0	--	2	10	Yes	No
Dishwashing room	-	--	--	10	Yes	No
Dietary day storage	0	--	--	2	--	No
Laundry, general	0	--	2	10	Yes	No
Soiled linen sorting and storage	-	--	--	10	Yes	No
Clean linen storage ⁴	+	--	2	2	--	--
Anesthesia storage	0	--	--	8	Yes	No
Central medical and surgical supply	-	--	2	4	--	No
Soiled or decontamination room	+	--	2	4	--	--
Clean workroom	0	--	2	2	--	--
Unsterile supply storage	0	--	2	2	--	--

+ = Positive - = Negative 0 = Equal -- = Optional

- ¹ See sec. 8-23D2n and sec. 8-23D2o for additional requirements.
² See sec. 8-23D2n for additional requirements.
³ See sec. 8-23D2q for exceptions.
⁴ See sec. 8-23D2s for additional requirements.

- m. Cold-air ducts shall be insulated wherever necessary to maintain the efficiency of the system or to minimize condensation problems.
- n. Laboratories shall be provided with outdoor air at a rate of 2 air changes per hour. If this ventilation rate does not provide the air required to ventilate fume hoods and safety cabinets, additional air shall be provided. A filter with 90 percent efficiency shall be installed in the air supply system at its entrance to the media transfer room.
- o. Laboratory hoods for general use shall have a minimum average face velocity of 75 feet per minute. Hoods in which infectious or highly radioactive materials are processed shall have a face velocity of 100 feet per minute and each shall have an independent exhaust system with the fan installed at the discharge point of the system. Hoods used for processing infectious materials shall be equipped with a means for disinfection.
- p. Duct systems serving hoods shall be constructed of corrosion-resistant material. Duct systems serving hoods in which highly radioactive materials and strong oxidizing agents are used shall be constructed of stainless steel for a minimum distance of 10'0" from the hood and shall be equipped with washdown facilities.
- q. The air from dining areas may be used to ventilate the food preparation areas only after it has passed through a filter with 80 percent efficiency.
- r. Exhaust hoods in food preparation centers shall have a minimum exhaust rate of 100 cubic feet per minute per square foot of hood face area. All hoods over cooking ranges shall be equipped with fire extinguishing systems and heat-actuated fan controls. Clean-out openings shall be provided every 20'0" in horizontal exhaust duct systems serving hoods.
- s. The ventilation system for anesthesia storage rooms shall conform to the requirements of NFPA Standard No. 56.
- t. Boiler rooms shall be provided with sufficient outdoor air to maintain combustion rates of equipment and reasonable temperatures in the rooms and in adjoining areas.
- u. See sec. 8-20A13 for additional boiler room, food preparation center, and laundry ventilation requirements.

E. Plumbing and Other Piping Systems. All plumbing systems shall be installed in accordance

with the requirements of Appendix C, Hospital Plumbing, in PHS Pub. No. 1038.

1. Plumbing fixtures

- a. The material used for plumbing fixtures shall be of nonabsorptive acid-resistant material.
- b. Lavatories and sinks required in patient care areas shall have the water supply spout mounted so that its discharge point is a minimum distance of 5 inches above the rim of the fixture. All fixtures used by medical and nursing staff, and all lavatories used by patients and food handlers shall be trimmed with valves which can be operated without the use of hands. Where blade handles are used for this purpose they shall not exceed 4 1/2 inches in length, except that handles on scrub sinks and clinical sinks shall be not less than 6 inches long.
- c. Clinical sinks shall have an integral trap in which the upper portion of a visible trap seal provides a water surface.

2. Water supply systems

- a. Systems shall be designed to supply water to the fixtures and equipment on the upper floors at a minimum pressure of 15 pounds per square inch during maximum demand periods.
- b. Each water service main, branch main, riser and branch to a group of fixtures shall be valved. Stop valves shall be provided at each fixture.
- c. Hot, cold, and chilled water piping, and waste piping on which condensation may occur shall be insulated. Insulation of cold and chilled water lines shall include an exterior vapor barrier.
- d. Backflow preventers shall be installed on hose bibbs and on all fixtures to which hoses or tubing can be attached such as laboratory and janitors' sinks, bedpan flushing attachments, and autopsy tables.
- e. Flush valves installed on plumbing fixtures shall be of a quiet operating type, equipped with silencers.
- f. Bedpan flushing devices shall be provided in each patient toilet room and in the soiled workroom.
- g. Hot water distribution systems shall be arranged to provide hot water at each fixture at all times.

3. Hot water heaters and tanks

- a. The hot water heating equipment shall have sufficient capacity to supply water at the temperature and amounts indicated below:

	<u>Use</u>		
	<u>Clinical</u>	<u>Dietary</u>	<u>Laundry</u>
Gal/hr/bed	6 1/2	4	4 1/2
Temp. °F.	125	180	180

- b. Storage tank(s) shall be provided and shall be fabricated of noncorrosive metal or lined with noncorrosive material.

4. Drainage systems

- a. Drain lines from sinks in which acid wastes may be poured shall be fabricated from an acid-resistant material.
- b. Piping over operating and delivery rooms, nurseries, food preparation centers, food serving facilities, food storage areas, and other critical areas shall be kept to a minimum and shall not be exposed. Special precautions shall be taken to protect these areas from possible leakage of necessary overhead piping systems.
- c. Floor drains shall not be installed in operating and delivery rooms.
- d. Building sewers shall discharge into a community sewerage system. Where such a system is not available, a facility providing sewage treatment which conforms to applicable local and State regulations is required.

5. Fire extinguishing systems. Automatic fire extinguishing systems shall be installed in areas such as, central soiled linen holding rooms, maintenance shops, trash rooms, bulk storage rooms and adjacent corridors, attics accessible for storage, and laundry and trash chutes. Storage rooms of less than 100 square-foot area and spaces used for storage of nonhazardous materials are excluded from this requirement. Sprinkler heads shall be installed at the top and at alternate floor levels of trash and laundry chutes.

6. Nonflammable medical gas systems. Nonflammable medical gas system installations shall be in accordance with the requirements of NFPA Standard No. 565.

8-24 ELECTRICAL REQUIREMENTS

A. General

1. All material including equipment, conductors, controls, and signaling devices shall be installed to provide a complete electrical system with the necessary characteristics and capacity to supply the electrical facilities shown in the specifications or indicated on the plans. All materials shall be listed as complying with applicable standards of Underwriters' Laboratories, Inc., or other similarly established standards.

2. The contractor shall be responsible for testing all electrical installations and systems and shall show that the equipment is correctly installed and operates as planned or specified. A written record of tests of conductive floors, ground contact indicators, and radiation protection shall be supplied to the owner.

B. Special Feeders and Circuits. Fixed and mobile X-ray units shall be connected by means of independent feeders or circuits.

C. Switchboard and Power Panels. Circuit breakers or fusible switches that provide disconnecting means and overcurrent protection for conductors connected to switchboards and distribution panelboards shall be enclosed or guarded to provide a dead-front type of assembly. The main switchboard shall be located in a separate enclosure accessible only to authorized persons. The switchboard shall be convenient for use, readily accessible for maintenance, clear of traffic lanes, and in a dry ventilated space devoid of corrosive fumes or gases. Overload protective devices shall be suitable for operating properly in the ambient temperature conditions.

D. Distribution Panelboards. Lighting and appliance panelboards shall be provided for the circuits on each floor. This requirement does not apply to emergency system circuits.

E. Lighting

1. All spaces occupied by people, machinery, and equipment within buildings, and the approaches thereto, and parking lots shall have electric lighting.

2. Patients' bedrooms shall have general lighting and night lighting. A reading light shall be provided for each patient. At least one luminaire for

night lighting shall be switched at the entrance to each patient room. Patients' reading lights and other fixed lights not switched at the door shall have switch controls convenient for use at the luminaire. All switches for control of lighting in patient areas shall be of the quiet operating type.

3. Operating and delivery rooms shall have general lighting for the room in addition to local lighting provided by special lighting units at the surgical and obstetrical tables. Each special lighting unit for local lighting at tables shall be connected to an independent circuit.

F. Receptacles (convenience outlets)

1. Anesthetizing locations. Each operating, delivery, and emergency room shall have at least three receptacles of the interchangeable type as defined in NFPA Standard No. 56. In locations where mobile X-ray is used, an additional receptacle, distinctively marked for X-ray use, shall be fed by an independent ungrounded circuit.

2. Bedroom. Each patient bedroom shall have duplex receptacles as follows: one on each side of the head of each bed (for parallel adjacent beds, only one receptacle is required between the beds); receptacles for luminaires and motorized beds, if used; and one receptacle on another wall.

3. Corridors. Single polarized receptacles marked for use of X-ray only shall be located in corridors of patient areas so that mobile equipment may be used in any location within a patient room. If the same mobile X-ray unit is used in operating rooms and in nursing areas, all receptacles for X-ray use shall be of a configuration that one plug will fit the receptacles in all locations. Single receptacles for equipment such as floor cleaning machines shall be installed approximately 50'0" apart in all corridors and shall be polarized to prevent use interchange with X-ray receptacles. Duplex receptacles for general use shall be installed approximately 50'0" apart in all corridors and within 25'0" of ends of corridors.

4. Pediatric units. Receptacles in patient rooms shall be of the safety type. Receptacles in corridors shall be of safety type or shall be controlled by switches located at a nurses' station or other supervised location.

G. Equipment Installation in Special Areas

1. Installation in hazardous areas. In areas where flammable anesthetic agents are used, such as operating, delivery, emergency, and anesthesia induction rooms, and rooms for storage of flammable gases, all electrical equipment and devices including receptacles, wiring, and conductive flooring installations shall comply with NFPA Standard No. 56.

2. X-ray and gamma-ray installations. X-ray stationary installations and mobile equipment shall conform to Article 660 of NFPA Standard No. 70. The capacities of conductors supplying X-ray units, control, grounding, and the overcurrent protective devices, shall conform to NEMA Bulletin XR4-10.

3. X-ray film illuminator. Viewing panels shall be installed in each operating room and in the X-ray viewing room.

H. Nurses' Calling System. For patients' use at each bed, nurses' calling stations shall be provided that will register a call from the patient at the nurses' station and actuate a visual signal at the patient room door, in the clean workroom, soiled workroom, and nourishment station of the nursing unit. In multicorridor nursing units, additional visible signals shall be installed at corridor intersections. In rooms containing two or more calling stations, indicating lights shall be provided at each calling station. Nurses' calling systems which provide two-way voice communication shall be equipped with an indicating light at each calling station which lights and remains lighted as long as the voice circuit is operating. An emergency calling station shall be provided convenient for patients' use at each patient toilet, bath, or shower room. An emergency nurses' calling station shall be provided for nurses' use in each operating, delivery, recovery, emergency, and intensive nursing care room; and in nurseries, supervised wards for mental patients, and rooms for children.

I. Fire Alarms. A manually-operated, electrically-supervised fire alarm system shall be installed in each hospital that has a total floor area of more than 5,000 square feet. In multistory buildings or in multibuilding facilities, the signal shall be coded or otherwise arranged to indicate

the location of the station operated. Presignal systems will not be permitted.

J. Emergency Electric Service

1. General. To provide electricity during an interruption of the normal electric supply that could affect the medical care, treatment, or safety of the occupants, an emergency source of electricity shall be provided and connected to certain circuits for lighting and power.

2. Sources. The source of this emergency electric service shall be as follows:

- a. An emergency generating set, when the normal service is supplied by one or more central station transmission lines.
- b. An emergency generating set or a central station transmission line, when the normal electric supply is generated on the premises.

3. Emergency generating set. The required emergency generating set, including the prime mover and generator, shall be located on the premises and shall be reserved exclusively for supplying the emergency electrical system. Exception: A system of prime movers which are ordinarily used to operate other equipment and alternately used to operate the emergency generator(s) will be permitted provided that the number and arrangement of the prime movers is such that when one of them is out of service (due to breakdown or for routine maintenance), the remaining prime mover(s) can operate the required emergency generator(s) and provided that the connection time requirements described in sec. 8-24J5 are met. The emergency generator set shall be of sufficient kilowatt capacity to supply all lighting and power load demands of the emergency system. The power factor rating of the generator shall be not less than 80 percent.

4. Emergency electrical connections. Emergency electric service shall be provided to circuits as follows:

a. Lighting

- (1) Exitways and all necessary ways of approach thereto including exit signs and exit direction signs, exterior of exits, exit doorways, stairways, and corridors.
- (2) Surgical, obstetrical, and emergency room operating lights.
- (3) Nursery, laboratory, recovery room, intensive care areas, nursing station,

medication preparation area, and labor rooms.

- (4) Generator set location, switch-gear location, and boiler room.
- (5) Elevator (if required for emergency).

b. Equipment. Essential to life safety and for protection of important equipment or vital materials:

- (1) Nurses' calling system.
- (2) Alarm system including fire alarm actuated at manual stations, water flow alarm devices of sprinkler system if electrically operated, fire detecting and smoke detecting systems, paging or speaker systems if intended for issuing instructions during emergency conditions, and alarms required for nonflammable medical gas systems, if installed.
- (3) Fire pump, if installed.
- (4) Receptacles for incubators for infants.
- (5) Pump for central suction system.
- (6) Sewerage or sump lift pump, if installed.
- (7) Receptacles for blood bank refrigerator.
- (8) Receptacles in operating, recovery, intensive care, and delivery rooms except those for X-ray. At least one duplex receptacle in each nursery.
- (9) Duplex receptacles in patient corridors.
- (10) One elevator, where elevators are used to transport patients to operating and delivery rooms or from these rooms to nursing areas on another floor.
- (11) Equipment such as burners and pumps necessary for operation of one or more boilers and their necessary auxiliaries and controls, required for heating and sterilization.
- (12) Ventilation of operating and delivery rooms.
- (13) Equipment necessary for maintaining telephone service.
- (14) One electric sterilizer, if installed.

c. Heating. Where electricity is the only source of power normally used for space heating, the emergency service shall provide for heating of operating, delivery, labor, recovery, intensive care, nurseries, and patient rooms. Emergency heating of patient rooms will not be required under either of the following conditions: (1) the design temperature is higher than +20°F., based on the Median of Extremes as shown in the current edition of the ASHRAE Hand-

book of Fundamentals; or (2) the hospital is supplied by at least two utility service feeders, each supplied by separate generating sources, or a network distribution system fed by two or more generators, with the hospital feeders so routed, connected, and protected that a fault in any place between the generators and the hospital will not likely cause an interruption of more than one of the hospital service feeders.

5. Details. The emergency electrical system shall be so controlled that after interruption of the normal electric power supply, the generator is brought to full voltage and frequency and connected within 10 seconds through one or more primary automatic transfer switches to all emergency lighting; all alarms; blood banks; nurses' call; equipment necessary for maintaining telephone service; pump for central suction system; and receptacles in operating and delivery rooms, patient

corridors, recovery rooms, intensive care nursing areas, and nurseries. All other lighting and equipment required to be connected to the emergency system shall either be connected through the above described primary automatic transfer switching or shall be subsequently connected through other automatic or manual transfer switching. Receptacles connected to the emergency system shall be distinctively marked for identification. Storage-battery-powered lights, provided to augment the emergency lighting or for continuity of lighting during the interim of transfer switching immediately following an interruption of the normal service supply, shall not be used as a substitute for the requirement of a generator. Where fuel is normally stored on the site, the storage capacity shall be sufficient for 24-hour operation. Where fuel is normally piped underground to the site from a utility distribution system, storage facilities on the site will not be required.

9 FACILITY FOR LONG-TERM CARE -- NURSING HOMES AND CHRONIC DISEASE HOSPITALS

NOTE: All long-term care facilities shall contain all the elements described herein and shall be built in accordance with the construction requirements outlined; elements that are available through proper affiliation with an adjacent hospital need not be duplicated in the long-term care facility.

9-1 SPECIAL CONSIDERATIONS

A. Independent long-term care facilities with a capacity of 50 beds or less present special problems. The sizes of the various departments will depend upon the requirements of the facilities. Some functions allotted separate spaces or rooms in these general standards may be combined provided that the resulting plan will not compromise the best standards of safety and of medical and nursing practices and the social needs of patients. In other respects, the general standards set forth herein, including the area requirements, shall apply.

B. Facilities shall be available to the public, staff, and patients who may be physically handicapped. Minimum requirements except as noted in these standards shall be those set forth in USASI Pub. No. A117.1-1961.

9-2 NURSING UNIT

The number of beds in a nursing unit shall not exceed 60 unless additional services are provided. At least two rooms per nursing unit shall be designed for single person occupancy (1 bed) and shall have private toilet rooms. At least 60 percent of the beds shall be located in rooms designed for one or two beds.

A. Patient Rooms. Each patient room shall meet the following requirements:

1. Maximum room capacity: 4 patients.
2. Minimum room area exclusive of closets, toilet rooms, lockers, wardrobes, and vestibules: 100 square feet in one-bed rooms and 80 square feet per bed in multibed rooms.
3. Multibed rooms shall be designed to permit no more than two beds side by side parallel to the window wall.

4. Window: Sill shall not be higher than 3'0" above the floor and shall be above grade.

5. Nurses' calling station(s). (See sec. 9-18F.)

6. Lavatory. In single and two-bed rooms, the lavatory may be located in a private toilet room.

7. Wardrobe or closet for each patient. Minimum clear dimensions: 1'10" deep by 1'8" wide with full length hanging space; provide clothes rod and shelf.

8. Cubicle curtains, or equivalent built-in devices, for privacy for each patient in multibed rooms.

9. No patient room shall be located more than 120'0" from the nurses' station, the clean workroom, and the soiled workroom.

B. Service Areas in Each Nursing Unit. The size of each service area will depend on the number and types of beds within the unit and shall include:

1. Nurses' station. For nurses' charting, doctors' charting, communications, and storage for supplies and nurses' personal effects.
2. Nurses' toilet room. Convenient to nurses' station.
3. Clean workroom. For storage and assembly of supplies for nursing procedures; shall contain work counter and sink.
4. Soiled workroom. Shall contain clinical sink, work counter, waste receptacles, and soiled linen receptacles.
5. Medicine room. Adjacent to nurses' station; with sink, refrigerator, locked storage, and facilities for preparation and dispensing of medication. (May be a designated area within clean workroom if a self-contained cabinet is provided.)

6. Clean linen storage. Enclosed storage space. (May be a designated area within the clean workroom.)

7. Nourishment station. Storage and sink for serving between-meal nourishments. (May serve more than one nursing unit.)

8. Equipment storage room. For storage of IV stands, inhalators, air mattresses, walkers, and similar bulky equipment.

9. Patient baths. One shower stall or one bathtub for each 15 beds not individually served. There shall be at least one bathtub in each nursing unit. Grab bars shall be provided at all bathing fixtures. Each bathtub or shower enclosure in central bathing facilities shall provide space for the private use of the bathing fixture, for dressing, and for a wheelchair and attendant. Showers in central bathing facilities shall not be less than 4'0" square, without curbs, and designed to permit use from a wheelchair. Soap dishes in showers and bathrooms shall be recessed.

10. Stretcher and wheelchair parking area or alcove.

11. Janitor's closet. Storage of housekeeping supplies and equipment. Floor receptor or service sink.

C. Patient Toilet Rooms

1. A toilet room shall be directly accessible from each patient room and from each central bathing area without going through the general corridor. One toilet room may serve two patient rooms but not more than 4 beds. (The lavatory may be omitted from the toilet room if one is provided in each patient room. The minimum dimensions of any room containing only a water closet shall be 3'0" by 6'0".)

2. Water closets must be easily usable by wheelchair patients. Grab bars shall be provided at all water closets.

3. At least one room shall be provided for toilet training; this shall be accessible from the nursing corridor and may serve the bathing area, and shall provide 3'0" clearance at the front and sides of the water closet.

4. Doors to toilet rooms shall have a minimum width of 2'10" to admit a wheelchair.

D. Special Purpose Room(s) may serve more than one nursing unit on the same floor. For consultation, examination and treatment, and therapeutic and nursing procedures. Provide lavatory, storage, and space for treatment table.

E. Sterilizing Room. An autoclave shall be provided which may serve more than one nursing unit. (May be a designated area within clean workroom.)

9-3 PATIENTS' DINING AND RECREATION AREAS

A. The total areas set aside for these purposes shall be not less than 30 square feet per bed for the first 100 beds and 27 square feet per bed for all beds in excess of 100. Additional space shall be provided for outpatients if they participate in a day care program.

B. Storage shall be provided for recreational equipment and supplies.

9-4 PHYSICAL THERAPY UNIT

(May be omitted in facilities of less than 100 beds.)

The following shall be provided:

A. Office. (May also serve for occupational therapy.)

B. Exercise and Treatment Areas. Provide sink or lavatory and cubicle curtains around treatment areas.

C. Hydrotherapy Area. Provide cubicle curtains.

D. Storage for Supplies and Equipment

E. Toilet Room. Located for convenient access by physical therapy patients. (May also serve occupational therapy patients.)

F. Waiting Space

9-5 OCCUPATIONAL THERAPY UNIT

(May be omitted in facilities of less than 100 beds.)

A. Office Space. (May be provided in physical therapy unit.)

FACILITY FOR LONG-TERM CARE
Section 9-5

- B. Therapy Area. Provide sink or lavatory.
- C. Storage for Supplies and Equipment
- D. Toilet Room. (Not required if other toilet facilities are convenient.)

9-6 PERSONAL CARE ROOM

Provide with barber and beauty shop facilities.

9-7 DIETARY DEPARTMENT

Construction, equipment, and installation shall comply with or exceed the minimum standards set forth in PHS Pub. No. 934. The department shall include the following facilities unless commercially prepared dietary service, meals, and/or disposables are to be used. If a commercial service will be used or meals will be provided by an adjacent hospital, dietary areas and equipment shall be designed to accommodate the requirements for sanitary storage, processing, and handling.

- A. Food Preparation Center. Provide lavatory but do not provide mirror.
- B. Food Serving Facilities. For patients and staff.
- C. Dishwashing Room. Provide commercial-type dishwashing equipment and a lavatory.
- D. Potwashing Facilities
- E. Refrigerated Storage. Three-day supply.
- F. Day Storage. Three-day supply.
- G. Cart Cleaning Facilities
- H. Cart Storage Area
- I. Waste Disposal Facilities
- J. Canwashing Facilities
- K. Staff Dining Facilities
- L. Patient Dining Facilities. (See sec. 9-3.)

M. Dietitian's Office. (May be omitted in facilities with less than 100 beds if desk space is provided in kitchen.)

N. Janitor's Closet. Storage for housekeeping supplies and equipment; floor receptor or service sink.

O. Toilet Room. Conveniently accessible for dietary staff.

9-8 ADMINISTRATION DEPARTMENT

This department shall include:

- A. Business Office
- B. Lobby and Information Center
- C. Administrator's Office
- D. Admitting and Medical Records Area
- E. Public and Staff Toilet Room
- F. Director of Nurse's Office. (May be omitted in facilities of less than 100 beds.)
- G. Housekeeper's Office or Space. (Location optional and may be combined with clean linen room in nursing homes of less than 100 beds.)

9-9 LAUNDRY

The laundry shall include:

- A. Soiled Linen Room
- B. Clean Linen and Mending Room
- C. Linen Cart Storage
- D. Lavatories. Accessible from soiled, clean, and processing rooms.
- E. Laundry Processing Room. Commercial-type equipment shall be sufficient to take care of 7 day's needs within the workweek.

F. Janitor's Closet. Storage for housekeeping supplies and equipment; floor receptor or service sink.

G. Storage for Laundry Supplies

(Items E, F, and G need not be provided if laundry is processed outside the facility.)

9-10 CENTRAL STORAGE ROOM(S)

Provide at least 10 square feet per bed concentrated in one area.

9-11 LOCKER ROOMS

Provide locker rooms with water closets, and lavatories for staff and volunteers and rest space for females.

9-12 ENGINEERING SERVICE
AND EQUIPMENT AREAS

The following shall be provided:

A. Boiler Room

B. Engineers' Office. (May be omitted in nursing homes of less than 100 beds.)

C. Mechanical and Electrical Equipment Room(s)

D. Maintenance Shop(s). At least one room shall be provided.

E. Storage Room for Building Maintenance Supplies. (May be part of maintenance shop in facilities of less than 100 beds.)

F. Storage Room for Housekeeping Equipment. (Need not be provided if space is available in janitor's closet elsewhere.)

G. Toilet and Shower Rooms. (May be omitted in nursing homes of less than 100 beds.)

H. Incinerator Space. The incinerator shall be in a separate room, or in a designated area within the boiler room, or outdoors. (See sec. 9-17B.)

I. Refuse Room. For holding trash prior to disposal. Shall be located convenient to service entrance. (See sec. 9-14A13d.)

J. Yard Equipment Storage Room. For yard maintenance equipment and supplies.

9-13 ADDITIONAL ELEMENTS FOR
CHRONIC DISEASE HOSPITALS

A. General. The following service areas shall be included in a chronic disease hospital type long-term care facility when justified by program requirements.

1. Surgical suite. (See sec. 8-6.)

2. Radiology. (See sec. 8-9.)

3. Laboratory. (See sec. 8-10.)

4. Pharmacy or drug room.

5. Central medical and surgical supply. (See sec. 8-15.)

6. Outpatient services. (See sec. 8-8.)

7. Medical director's office.

8. Social service office(s).

9. Staff lounge and medical library.

10. Dental facilities.

- a. Operatory
- b. Laboratory and darkroom
- c. Lavatory

11. Chiropodist facilities.

12. Speech and hearing facilities.

- a. Office(s) for staff
- b. Space for examination and treatment

9-14 DETAILS AND FINISHES

A high degree of safety for the occupants in minimizing the incidence of accidents shall be

provided. Hazards such as sharp corners shall be avoided. All details and finishes shall meet the following requirements:

A. Details

1. Exit facilities shall comply with the requirements for exit facilities listed in NFPA Standard No. 101. Minimum corridor widths shall be 8'0". Minimum width of doors to all rooms needing access for beds or stretchers shall be 3'8". Doors to patient toilet rooms and other rooms needing access for wheelchairs shall have a minimum width of 2'10".

2. Such items as drinking fountains, telephone booths, and vending machines shall be located so that they do not project into the required width of exit corridors.

3. Handrails with ends returned to the walls shall be provided on both sides of corridors used by patients in nursing homes with a clear distance of 1 1/2 inches between handrail and wall.

4. All doors to patient-room toilet rooms and patient-room bathrooms shall be equipped with hardware which will permit access in any emergency.

5. All doors opening onto corridors shall be swing-type except elevator doors. Alcoves and similar spaces which generally do not require doors are excluded from this requirement.

6. No doors shall swing into the corridor except closet doors.

7. Thresholds and expansion joint covers, if used, shall be flush with the floor.

8. Grab bars and accessories in patient toilet-, shower-, and bath-rooms shall have sufficient strength and anchorage to sustain a load of 250 pounds for 5 minutes.

9. Lavatories intended for use by patients shall be installed to permit wheelchairs to slide under.

10. The location and arrangement of lavatories and sinks with blade handles intended for handwashing purposes shall provide clearance necessary for operation without use of hands. (See sec. 9-17E1b.)

11. Mirrors shall be arranged for convenient use by patients in wheelchairs as well as by patients in a standing position.

12. Paper towel dispensers shall be provided at all lavatories and sinks used for handwashing.

13. If linen and refuse chutes are used, they shall be designed as follows. (See also sec. 9-17B.)

- a. Service openings to chutes shall have approved class "B", 1 1/2-hour fire doors.
- b. Service openings to chutes shall be located in a room or closet of not less than 1-hour fire-resistive construction, and the entrance door to such room or closet shall be a class "C", 3/4-hour fire door.
- c. Minimum diameter of gravity-type chutes shall be 2'0".
- d. Chutes shall terminate in or discharge directly into a refuse room or linen chute room separated from the incinerator or laundry. Such rooms shall be of not less than 2-hour fire-resistive construction and the entrance door shall be a class "B", 1 1/2-hour fire door.
- e. Chutes shall extend at least 4'0" above the roof and shall be covered by a metal skylight glazed with thin plain glass.

14. Dumbwaiters, conveyors, and material handling systems shall not open into any corridor or exitway but shall open into a room enclosed by not less than 1-hour fire-resistive construction. The entrance door to such room shall be a class "C", 3/4-hour fire door.

15. Protection requirements of X-ray and gamma-ray installations shall conform to NBS Handbooks, as follows:

- a. X-ray--Handbook 76.
- b. Gamma-ray--Handbook 73.

16. Ceiling heights

- a. Boiler room. Not less than 2'6" above the main boiler header and connecting piping with adequate headroom under piping for maintenance and access.
- b. Operating rooms, cystoscopic rooms, radiographic rooms, and other rooms having ceiling-mounted surgical light fixtures and therapy rooms having ceiling-mounted patient lifting devices. Not less than 9'0".
- c. Corridors, storage rooms, patients' toilet rooms, and other minor rooms. Not less than 7'6".
- d. All other rooms. Not less than 8'0".

17. Boiler rooms, food preparation centers, and laundries shall be insulated and ventilated to prevent any floor surface above from exceeding a temperature of 85°F.

18. Approved fire extinguishers shall be provided in recessed locations throughout the building in accordance with NFPA Standard No. 10.

19. Noise reduction criteria. Partition, floor, and ceiling construction in patient areas shall comply with table 3.

B. Finishes

1. For flame spread requirements, see sec. 9-16E.

2. Floors in anesthetizing areas and rooms used for storage of flammable anesthetic agents shall comply with NFPA Standard No. 56.

3. Floors generally shall be easily cleanable and shall have the wear resistance appropriate for the location involved. Floors in kitchens and related spaces shall be waterproof and greaseproof. In all areas where floors are subject to wetting, they shall have a nonslip finish.

4. Adjacent dissimilar floor materials shall be flush with each other to provide an unbroken surface.

5. Walls generally shall be washable and in the immediate area of plumbing fixtures the finish shall be moistureproof. Wall bases in dietary areas shall be free of spaces that can harbor insects.

6. Ceilings generally shall be washable or easily cleanable. This requirement does not apply to boiler rooms, mechanical and building equipment rooms, shops, and similar spaces.

7. Ceilings shall be acoustically treated in corridors in patient areas, nurses' stations, nourishment stations, and dining and recreation areas.

9-15 ELEVATORS

(For Chronic Disease Hospitals, see sec. 8-21. The following requirements apply to nursing homes.)

A. Elevators, Where Required. All nursing homes where either patient beds or inpatient facilities such as diagnostic, recreation, patient dining, or therapy rooms are located on other than the first floor, shall have electric or electrohydraulic elevators as follows:

1. Number of elevators

- a. At least 1 hospital-type elevator shall be installed where 1 to 59 patient beds are located

Table 3. SOUND TRANSMISSION LIMITATIONS FOR PARTITIONS AND FLOORS IN LONG-TERM CARE FACILITIES

Location	Airborne Sound Transmission Class (STC) ^{a/}		Impact Noise Rating (INR) ^{b/}
	Partitions	Floors	Floors
Patients' room to patients' room	45	45	-2
Corridor to patients' room	40	45	+5 <u>c/</u>
Public space to patients' room <u>d/</u>	50	50	+5 <u>c/</u>
Service areas to patients' room <u>e/</u>	55	55	+10 <u>c/</u>

a/ Sound transmission class (STC) shall be determined by tests in accordance with methods set forth in ASTM Standard E 90-66T.

b/ Impact noise rating (INR) shall be determined in accordance with criteria set forth in FHA Pub. No. 750. Tests shall be conducted in accordance with ISO Recommendations No. 140-1960.

c/ Impact noise limitation applicable only when corridor, public space, or service area is over patients' room.

d/ Public space includes lobbies, dining rooms, recreation rooms, treatment rooms, and similar spaces.

e/ Service areas include kitchens, elevators, elevator machine rooms, laundries, garages, maintenance rooms, boiler and mechanical equipment rooms, and similar spaces of high noise or vibration or both. Mechanical equipment located on the same floor or above patients' rooms, offices, nurses' stations, and similar occupied spaces shall be effectively isolated from such spaces with respect to noise and vibration.

NOTE: The requirements set forth in this table assume installation methods which will not appreciably reduce the efficiency of the assembly as tested. Location of electrical receptacles, grilles, ductwork, and other mechanical items, and blocking and sealing of partitions at floors and ceilings shall not compromise the sound isolation required.

on any floor other than the first. (For purposes of these requirements, the first floor is that floor first reached from the main front entrance.)

- b. At least 2 elevators, 1 of which shall be hospital-type, shall be installed where 60 to 200 patient beds are located on floors other than the first, or where inpatient facilities are located on a floor other than those containing the patient beds.
- c. At least 3 elevators, 1 of which shall be hospital-type, shall be installed where 201 to 350 patient beds are located on floors other than the first, or where inpatient facilities are located on a floor other than those containing the patient beds.
- d. For facilities with more than 350 beds, the number of elevators shall be determined from a study of the facility plan and the estimated vertical transportation requirements.

2. Cars and platforms. Elevator cars and platforms shall be constructed of noncombustible material, except that fire-retardant-treated material may be used if all exterior surfaces of the car are covered with metal. Cars of hospital-type elevators shall have inside dimensions that will accommodate a patient's bed and attendants and shall be at least 5'0" wide by 7'6" deep; car doors shall have a clear opening of not less than 3'8". Cars of all other required elevators shall have a minimum inside floor dimension of not less than 5'0"; car doors shall have a clear opening of not less than 3'0".

3. Leveling. Elevators shall have automatic leveling of the two-way automatic maintaining type with accuracy within plus or minus 1/2 inch.

4. Operation. Elevators (except freight elevators) shall be equipped with a two-way special service switch to permit cars to bypass all landing button calls and be dispatched directly to any floor.

B. Field Inspection and Tests. The contractor shall be required to cause inspections and tests to be made and shall deliver to the owner written certification that the installation meets the requirements set forth in this section.

9-16 CONSTRUCTION INCLUDING FIRE-RESISTIVE REQUIREMENTS

A. Foundations shall rest on natural solid ground if a satisfactory soil is available at reasonable

depths. Proper soil bearing values shall be established in accordance with recognized standards. If solid ground is not encountered at practical depths, the structure shall be supported on driven piles or drilled piers designed to support the intended load without detrimental settlement, except that one-story buildings may rest on a fill designed by a soils engineer. When engineered fill is used, site preparation and all grading shall be done under the direct full-time supervision of the soils engineer. The soils engineer shall issue a final report on the grading operation and a certification of compliance with the job specifications. Special review and approval by the Public Health Service will be required for foundations supported on engineered fill. All footings shall extend to a depth not less than one foot below the estimated maximum frost line.

B. One-Story Buildings. One-story buildings shall be of not less than 1-hour fire-resistive construction throughout, with the following exceptions:

1. Walls enclosing stairways, elevator shafts, chutes and other vertical shafts, boiler rooms, and storage rooms of 100 square feet or greater area shall be of 2-hour fire-resistive construction.

2. Heavy timber construction may be used in gymnasiums, chapels, auditoriums, and administration areas provided that these areas are so located as to be freestanding buildings or if attached to the main building, are suitably fire separated therefrom, do not form a major circulation element in the facility, and do not serve as a required means of egress.

C. Multistory Buildings

1. For all buildings more than one story in height, the structural framework and building elements shall be an appropriately fire-resistive combination of materials using steel, concrete, or masonry. Load-bearing walls may be used only for exterior walls, fire walls, and vertical shafts.

2. Bearing walls and walls enclosing stairways, elevator shafts, chutes and other vertical shafts, boiler rooms, and storage rooms of 100 square feet or greater area shall be of 2-hour fire-resistive construction.

3. Nonload-bearing corridor partitions shall be of 1-hour fire-resistive construction.

4. Columns, girders, trusses, floor construction including beams, and roof construction including beams shall be of not less than 1 1/2-hour fire-resistive construction.

5. Beams supporting masonry shall be individually protected with not less than 2-hour fire-resistive construction.

6. Nonload-bearing partitions other than corridor partitions shall be of 1-hour fire-resistive construction and may utilize fire-retardant-treated wood studs.

D. Fire-resistive ratings shall be determined in accordance with ASTM Standard No. E 119.

E. Interior finish of walls and ceilings of all exit-ways, storage rooms, and areas of unusual fire hazard shall have a flame spread rating of not more than 25; all other areas shall have a flame spread rating of not more than 75, except that up to 10 percent of the aggregate wall and ceiling area may have a finish with a rating up to 200. Floor finish materials shall have a flame spread rating of not more than 75. Flame spread ratings for each specific product shall be determined by an independent testing laboratory in accordance with ASTM Standard No. E 84-61.

9-17 MECHANICAL REQUIREMENTS

A. General

1. Prior to completion of the contract and final acceptance of the facility, the architect and/or engineer shall obtain from the contractor certification that all mechanical systems have been tested and that the installation and performance of these systems conform to the requirements of the plans and specifications.

2. Upon completion of the contract, the contractor shall furnish the owner with a bound volume containing operating instructions, manufacturers' catalog numbers, and description and parts list for each piece of equipment.

B. Incinerators and Refuse Chutes. Incinerators shall be gas-, electric-, or oil-fired and shall be capable of, but need not be limited to, complete destruction of pathological wastes. Design and construction of incinerators and refuse chutes shall be in accordance with Part III of the NFPA Standard No. 82.

C. Steam and Hot Water Systems

1. Boilers. Boilers shall have the capacity, based upon the published Steel Boiler Institute or Institute of Boiler and Radiator Manufacturers' net ratings, to supply the normal requirements of all systems and equipment. The number and arrangement of boilers shall be such that when one boiler breaks down or when routine maintenance requires that one boiler be temporarily taken out of service, the capacity of the remaining boiler(s) shall be 70 percent of the total required capacity. (In areas in a design temperature zone higher than +20°F., based on the Median of Extremes shown by the ASHRAE Handbook of Fundamentals, boiler capacity for space heating, when one boiler is out of service, will not be required.)

2. Boiler accessories. Boiler feed pumps, condensate return pumps, fuel oil pumps, and circulating pumps shall be connected and installed to provide standby service when any pump breaks down.

3. Valves. Supply and return mains and risers of space heating and process steam systems shall be valved to isolate the various sections of each system. Each piece of equipment shall be valved at the supply and return end.

4. Covering. Boilers, smoke breeching, steam supply piping, high pressure steam return piping, and hot water space heating supply and return piping shall be insulated with insulation having a flame spread rating of 25 or less and a smoke-developed rating of 50 or less.

D. Air Conditioning, Heating, and Ventilating Systems. (For Chronic Disease Hospitals, see sec. 8-23D. The following requirements apply to nursing homes.)

1. Temperatures. A minimum temperature of 75°F. shall be provided for all occupied areas at winter design conditions.

2. Ventilation system details. All air-supply and air-exhaust systems shall be mechanically operated. All fans serving exhaust systems shall be located at or near the point of discharge from the building. The ventilation rates shown on table 4 shall be considered as minimum acceptable rates and shall not be construed as precluding the use of higher ventilation rates if they are required to meet design conditions.

a. Outdoor ventilation air intakes, other than for individual room units, shall be located as far away as practicable but not less than 25'0" from the exhausts from any ventilating

Table 4. PRESSURE RELATIONSHIPS AND VENTILATION OF CERTAIN NURSING HOME AREAS

Area Designation	Pressure Relationship to Adjacent Areas	All Supply Air from Outdoors	Minimum Air Changes of Out- door Air Per Hour	Minimum Total Air Changes Per Hour	Exhausted Directly to Outdoors	All Air	Recirculated Within Room
Patient room	0	--	2	2	--	--	--
Patient area corridor	0	--	2	4	--	--	--
Special purpose room	0	--	2	6	Yes	Yes	No
Physical therapy and hydrotherapy	-	--	2	6	--	--	--
Soiled workroom	-	--	2	4	--	--	No
Clean workroom	+	--	2	4	--	--	--
Toilet room	-	--	--	10	Yes	Yes	No
Bedpan room	-	--	--	10	Yes	Yes	No
Bathroom	-	--	--	10	Yes	Yes	No
Janitor's closet	-	--	--	10	Yes	Yes	No
Sterilizer equipment room	-	--	--	10	Yes	Yes	No
Linen and trash chute rooms	-	--	--	10	Yes	Yes	No
Food preparation center	0	--	2	10	Yes	Yes	No
Dishwashing room	-	--	--	10	Yes	Yes	No
Dietary day storage	0	--	--	2	--	--	No
Laundry, general	0	--	2	10	Yes	Yes	No
Soiled linen sorting and storage	-	--	--	10	Yes	Yes	No
Clean linen storage	+	--	2	2	--	--	--

+ = Positive - = Negative 0 = Equal -- = Optional

1 See sec. 9-17D2k for exceptions.

system or combustion equipment. The bottom of outdoor intakes serving central air systems shall be located as high as possible but not less than 8'0" above the ground level or, if installed through the roof, 3'0" above roof level.

- b. The ventilation systems shall be designed and balanced to provide the general pressure relationship to adjacent areas shown in table 4.
- c. Room supply air inlets, recirculation, and exhaust air outlets shall be located not less than 3 inches above the floor.
- d. Corridors shall not be used to supply air to or exhaust air from any room, except that exhaust air from corridors may be used to ventilate rooms such as bathrooms, toilet rooms, or janitor's closets which open directly on corridors.
- e. Filters. Central systems designed for recirculation of air shall be equipped with a minimum of 2 filter beds. Filter bed #1 shall be located upstream of the conditioning equipment and shall have a minimum efficiency of 30 percent. Filter bed #2 shall be located downstream of the conditioning equipment and shall have a minimum efficiency of 90 percent.

Central systems using 100 percent outdoor air shall be provided with filters rated at 80 percent efficiency.

The above filter efficiencies shall be warranted by the manufacturer and shall be based on the National Bureau of Standards Dust Spot Test Method with Atmospheric Dust.

Filter frames shall be durable and carefully dimensioned, and shall provide an airtight fit with the enclosing ductwork. All joints between filter segments and the enclosing ductwork shall be gasketed or sealed to provide a positive seal against air leakage.

- f. A manometer shall be installed across each filter bed serving central air systems.
- g. Ducts shall be constructed of iron, steel, aluminum, or other approved metal or materials such as clay or asbestos cement.
- h. Duct linings shall meet the Erosion Test Method described in UL Pub. No. 181. Duct linings, coverings, vapor barriers, and the adhesives used for applying them shall have a flame spread classification of not more than 25 and a smoke-developed rating not more than 50.
- i. Ducts which pass through fire walls shall be provided with approved automatic fire doors on both sides of the wall except that 3/8-inch steel plates may be used in lieu of fire doors

for openings not exceeding 18 inches in diameter. An approved fire damper shall be provided on each opening through each fire partition and on each opening through the walls of a vertical shaft. Ducts which pass through a required smoke barrier shall be provided with dampers which are actuated by products of combustion other than heat. Access for maintenance shall be provided at all dampers.

- j. Cold air ducts shall be insulated wherever necessary to maintain the efficiency of the system or to minimize condensation problems.
- k. The air from dining areas may be used to ventilate the food preparation areas only after it has passed through a filter with 80 percent efficiency.
- l. Exhaust hoods in food preparation centers shall have a minimum exhaust rate of 100 cubic feet per minute per square foot of hood face area. All hoods over cooking ranges shall be equipped with fire extinguishing systems and heat-actuated fan controls. Cleanout openings shall be provided every 20'0" in horizontal exhaust duct systems serving hoods.
- m. Boiler rooms shall be provided with sufficient outdoor air to maintain combustion rates of equipment and reasonable temperatures in the rooms and in adjoining areas.
- n. See sec. 9-14A17 for additional boiler room, food preparation center, and laundry ventilation requirements.

E. Plumbing and Other Piping Systems. (For Chronic Disease Hospitals, see sec. 8-23E. The following requirements apply to nursing homes.) All plumbing systems shall be installed in accordance with the requirements of Appendix C, Hospital Plumbing, in PHS Pub. No. 1038.

1. Plumbing fixtures

- a. The material used for plumbing fixtures shall be of nonabsorptive acid-resistant material.
- b. Lavatories and sinks required in patient care areas shall have the water supply spout mounted so that its discharge point is a minimum distance of 5 inches above the rim of the fixture. All fixtures used by medical and nursing staff, and all lavatories used by patients and food handlers shall be trimmed with valves which can be operated without the use of hands. Where blade handles are used for this purpose, they shall not exceed

4 1/2 inches in length, except that handles on clinical sinks shall be not less than 6 inches long.

- c. Clinical sinks shall have an integral trap in which the upper portion of a visible trap seal provides a water surface.

2. Water supply systems

- a. Systems shall be designed to supply water to the fixtures and equipment on the upper floors at a minimum pressure of 15 pounds per square inch during maximum demand periods.
- b. Each water service main, branch main, riser and branch to a group of fixtures shall be valved. Stop valves shall be provided at each fixture.
- c. Hot, cold, and chilled water piping and waste piping on which condensation may occur shall be insulated. Insulation of cold and chilled water lines shall include an exterior vapor barrier.
- d. Backflow preventers (vacuum breakers) shall be installed on hose bibbs and on all fixtures to which hoses or tubing can be attached such as janitors' sinks and bedpan flushing attachments.
- e. Flush valves installed on plumbing fixtures shall be of a quiet operating type, equipped with silencers.
- f. Bedpan flushing devices shall be provided in each patient toilet room and in the soiled workroom.
- g. Hot water distribution systems shall be arranged to provide hot water at each fixture at all times.
- h. Plumbing fixtures which require hot water and which are intended for patient use shall be supplied with water which is controlled to provide a maximum water temperature of 110°F. at the fixture.

3. Hot water heaters and tanks

- a. The hot water heating equipment shall have sufficient capacity to supply the water at the temperatures and amounts indicated below:

	<u>Use</u>		
	Clinical	Dietary	Laundry
Gal/hr/bed	6 1/2	4	4 1/2
Temp. °F.	110	180	180

- b. Storage tank(s) shall be provided and shall be fabricated of corrosion-resistant metal.

4. Drainage systems

- a. Piping over food preparation centers, food serving facilities, food storage areas, and other critical areas shall be kept to a minimum and shall not be exposed. Special precautions shall be taken to protect these areas from possible leakage of or condensation from necessary overhead piping systems.
- b. Building sewers shall discharge into a community sewerage system. Where such a system is not available, a facility providing sewage treatment which conforms to applicable local and State regulations is required.

5. Fire extinguishing systems. Automatic fire extinguishing systems shall be installed in areas such as: central soiled linen holding rooms, maintenance shops, trash rooms, bulk storage rooms, and adjacent corridors, attics accessible for storage, and laundry and trash chutes. Storage rooms of less than a 100 square foot area and spaces used for storage of nonhazardous materials are excluded from this requirement. Sprinkler heads shall be installed at the top and at alternate floor levels of trash and laundry chutes.

6. Nonflammable medical gas systems. Nonflammable medical gas system installations shall be in accordance with the requirements of NFPA Standard No. 565.

9-18 ELECTRICAL REQUIREMENTS

(For Chronic Disease Hospitals, see Sec. 8-24. The following requirements apply only to nursing homes.)

A. General

1. All material including equipment, conductors, controls, and signaling devices shall be installed to provide a complete electrical system with the necessary characteristics and capacity to supply the electrical facilities shown in the specifications or indicated on the plans. All materials shall be listed as complying with applicable standards of Underwriters' Laboratories, Inc., or other similarly established standards.

2. The contractor shall be responsible for testing all electrical installations and systems and shall show that the equipment is correctly installed and operated as planned or specified.

B. Switchboard and Power Panels. Circuit breakers or fusible switches that provide disconnecting means and overcurrent protection for conductors connected to switchboards and distribution panelboards shall be enclosed or guarded to provide a dead-front type of assembly. The main switchboard shall be located in a separate enclosure accessible only to authorized persons. The switchboard shall be convenient for use, readily accessible for maintenance, clear of traffic lanes, and in a dry ventilated space devoid of corrosive fumes or gases. Overload protective devices shall be suitable for operating properly in the ambient temperature conditions.

C. Distribution Panelboards. Lighting and appliance panelboards shall be provided for the circuits on each floor. This requirement does not apply to emergency system circuits.

D. Lighting. All spaces occupied by people, machinery, and equipment within buildings, and the approaches thereto, and parking lots shall have electric lighting. Patients' bedrooms shall have general lighting and night lighting. A reading light shall be provided for each patient. At least one luminaire for night lighting shall be switched at the entrance to each patient room. Patients' reading lights and other fixed lights not switched at the door shall have switch controls convenient for use at the luminaire. All switches for control of lighting in patient areas shall be of the quiet operating type.

E. Receptacles (convenience outlets)

1. Bedroom. Each patient bedroom shall have duplex receptacles as follows: one on each side of the head of each bed (for parallel adjacent beds, only one receptacle is required between the beds); receptacles for luminaires, television, and motorized beds, if used; and one receptacle on another wall.

2. Corridors. Single receptacles for equipment such as floor cleaning machines shall be installed approximately 50'0" apart in all corridors. Duplex receptacles for general use shall be installed approximately 50 feet apart in all corridors and within 25'0" of ends of corridors.

F. Nurses' Calling System. A nurses' calling station shall be installed at each patient bed and in each patient toilet-, bath-, and shower-room.

The nurses' call in toilet-, bath-, or shower-rooms shall be an emergency call. All calls shall register at the nurses' station and shall actuate a visible signal in the corridor at the patients' door, in the clean workroom, soiled workroom, and nourishment station of the nursing unit. In multicorridor nursing units, additional visible signals shall be installed at corridor intersections. In rooms containing two or more calling stations, indicating lights shall be provided at each calling station. Nurses' call systems which provide two-way voice communication shall be equipped with an indicating light at each calling station which lights and remains lighted as long as the voice circuit is operative.

G. Fire Alarms. A manually-operated, electrically-supervised fire alarm system shall be installed in each facility that has a total floor area of more than 5,000 square feet. In multistory buildings or in multibuilding facilities, the signal shall be coded or otherwise arranged to indicate the location of the station operated. Pre-signal systems will not be permitted.

H. Emergency Electric Service

1. General. To provide electricity during an interruption of the normal electric supply that could affect the nursing care, treatment, or safety of the occupants, an emergency source of electricity shall be provided and connected to certain circuits for lighting and power.

2. Sources. The source of this emergency electric service shall be as follows:

- a. An emergency generating set, when the normal service is supplied by one or more central station transmission lines.
- b. An emergency generating set or a central station transmission line, when the normal electric supply is generated on the premises.

3. Emergency generating set. The required emergency generating set, including the prime mover and generator, shall be located on the premises and shall be reserved exclusively for supplying the emergency electrical system. Exception: A system of prime movers which are ordinarily used to operate other equipment and alternately used to operate the emergency generator(s) will be permitted provided that the number

and arrangement of the prime movers is such that when one of them is out of service (due to breakdown or for routine maintenance), the remaining prime mover(s) can operate the required emergency generator(s) and provided that the connection time requirements described in sec. 9-18H5 are met. The emergency generator set shall be of sufficient kilowatt capacity to supply all lighting and power load demands of the emergency system. The power factor rating of the generator shall be not less than 80 percent.

4. Emergency electrical connections. Emergency electric service shall be provided to circuits as follows:

a. Lighting

- (1) Exitways and all necessary ways of approach thereto including exit signs and exit direction signs, exterior of exits, exit doorways, stairways, and corridors.
- (2) Dining and recreation rooms.
- (3) Nursing station and medication preparation area.
- (4) Generator set location, switch-gear location, and boiler room.
- (5) Elevator (if required for emergency).

b. Equipment. Essential to life safety and for protection of important equipment or vital materials:

- (1) Nurses' calling system.
- (2) Alarm system including fire alarm actuated at manual stations, water flow alarm devices of sprinkler systems if electrically operated, fire detecting and smoke detecting systems, paging or speaker systems if intended for issuing instructions during emergency conditions, and alarms required for nonflammable medical gas systems, if installed.
- (3) Fire pump, if installed.
- (4) Sewerage or sump lift pump, if installed.
- (5) All required duplex receptacles in patient corridors.
- (6) One elevator, where elevators are used for vertical transportation of patients.
- (7) Equipment such as burners and pumps necessary for operation of one or more boilers and their necessary auxiliaries

and controls, required for heating and sterilization.

- (8) Equipment necessary for maintaining telephone service.

c. Heating. Where electricity is the only source of power normally used for space heating, the emergency service shall provide for heating of patient rooms. Emergency heating of patient rooms will not be required in areas where: (1) the design temperature is higher than +20°F., based on the Median of Extremes as shown in the current edition of the ASHRAE Handbook of Fundamentals, or (2) the nursing home is supplied by at least two utility service feeders, each supplied by separate generating sources, or a network distribution system fed by two or more generators, with the hospital feeders so routed, connected, and protected that a fault anywhere between the generators and the hospital will not likely cause an interruption of more than one of the hospital service feeders.

5. Details. The emergency electrical system shall be so controlled that after interruption of the normal electric power supply, the generator is brought to full voltage and frequency and connected within 10 seconds through one or more primary automatic transfer switches to all emergency lighting; all alarms; nurses' call; equipment necessary for maintaining telephone service; and receptacles in patient corridors. All other lighting and equipment required to be connected to the emergency system shall either be connected through the above described primary automatic transfer switching or shall be subsequently connected through other automatic or manual transfer switching. Receptacles connected to the emergency system shall be distinctively marked for identification. Storage-battery-powered lights, provided to augment the emergency lighting or for continuity of lighting during the interim of transfer switching immediately following an interruption of the normal service supply, shall not be used as a substitute for the requirement of a generator. Where fuel is normally stored on the site, the storage capacity shall be sufficient for 24-hour operation of required emergency electric services. Where fuel is normally piped underground to the site from a utility distribution system, storage facilities on the site will not be required.

10 NURSES' RESIDENCE

NOTE: Requirements for details and finishes, elevators, construction (including fire-resistance), mechanical systems, and electrical systems shall be the same as those for long-term care facilities. (Sec secs. 9-14, 9-15, 9-16, 9-17, and 9-18.)

Rooms:

One nurse per room:¹

100 square feet in single rooms.

150 square feet in double rooms.

Lavatory in each room.¹

Closet or wardrobe for each nurse.

No nurses' rooms shall be located on any floor which is below grade.

Common floor facilities:

Lounge with kitchenette to serve 30 to 60 nurses.

Laundry room with 2 trays and 2 ironing boards to serve each 60 nurses.¹ If not provided on each floor, a centrally located laundry room containing the same proportion of trays and ironing boards shall be provided.

Bath room: One shower or tub for each 6 beds.

Toilet room: With lavatories in bedrooms-- 1 water closet for each 6 beds and 1 lavatory for each 3 water closets. Without lavatories in bedrooms-- 1 water closet for each 6 beds and 1 lavatory for each 5 beds.

Linen closet.

Janitors' closet.

Telephone facilities.¹

General facilities:

Lobby.

Office.

Main lounge (with alcoves¹).

Men's toilet (off lobby).

Storage room for trunks.

Laundry distribution room.¹

Employees' toilet room.¹

Boiler room (if facilities not available elsewhere). Spare boiler may not be required.

Emergency lighting as per local code.

11 PUBLIC HEALTH CENTER

NOTE: Except as noted herein, requirements for details and finishes, elevators, construction (including fire-resistance), mechanical systems, and electrical systems shall be the same as those for long-term care facilities. (Sec secs. 9-14, 9-15, 9-16, 9-17, and 9-18.)

(a) Administration.

Where health department administration personnel have no offices in health center:

Waiting room.

Public toilets.

Office for public health nurses.

Staff toilets.

Assembly space: Waiting room may be used for this purpose where health centers serve under 30,000 population.

Where health department administration offices are provided in health centers add:

Health officer's office.

Office for sanitary engineers.

Health education office.

Staff room and library: In health center for over 30,000 population.

will depend on the program contemplated by the health department to take care adequately of the particular needs of the population served by the health center.

For populations up to 30,000:

Two examination rooms for maternal and child health, V.D. and TB clinics.

Consultation room.

Utility room.

Dental room.¹

For population over 30,000, if the following services are provided, they shall include areas noted as follows:

Maternal and child health:

Demonstration room.

Examining room.

Toilet.

Tuberculosis and X-ray:

X-ray room with dressing booths.

Dark room.

Consultation and viewing room.

(b) Clinical. The clinical services, and extent of such services, provided in the health center

¹ Desirable but not mandatory.

Venereal disease:

Examination room.
Treatment room.
Consultation room.
Toilet.

Dental:

Dental facilities (2 chairs desirable).
Small dental laboratory.
Pharmacy: Dispensing room.

(c) Laboratory. The volume and type of laboratory tests in the health center will vary with local conditions and will determine the size of the laboratory. Such factors as density of population, area to be served, type of center (municipal, county, or rural), its use as a branch of the State laboratory and availability of other laboratory facilities must be considered.

One room is required for urinalysis, hematology, and dark field examinations for syphilis and storage of biologicals furnished by the State Health Department.

Where food control, sanitation and communicable disease work is contemplated another room shall be furnished for this purpose.

(d) Service.

General storage areas.
Bulk office and janitors' supplies.
Bulk clinical supplies.
Educational material.
Storage closets:
Office supplies.
Medical supplies.
Educational material.
Janitors' closet: Centrally located.
Heating plant.

Width of corridors shall be not less than 5'0".
Greater width preferred. Windows of examination and treatment rooms shall be glazed with obscure glass to insure privacy.¹
Emergency quick acting cold water showers are required at convenient points in chemical laboratories.

Only one system of hot water will be required in health centers and the elbow- or knee-action lavatory and sink faucet handles will be required only in clinical rooms of health centers.

Spare boiler may not be required.
Emergency lighting as per local code.

12 STATE PUBLIC HEALTH LABORATORY

NOTE: Except as noted herein, requirements for details and finishes, elevators, construction (including fire-resistance), mechanical systems, and electrical systems shall be the same as those for long-term care facilities. (See secs. 9-14, 9-15, 9-16, 9-17, and 9-18.)

(a) Administration department.

Director's office.
Secretary's office.
Assistant Director's office.
Information desk and switchboard.
Clerical office.
Office supply room.
Library.
Staff meeting room.
Records and filing room.
Mailing and receiving room for incoming specimens, distribution of containers and of biologicals.
Specimen and emergency treatment room.

(b) Bacteriology department.

Office.
Water, food and milk laboratory.

Enteric disease and agglutination laboratory.
Tuberculosis laboratory.
Diagnostic laboratory.
Incubator room.
Sterile room.
Rabies room.
Adequate refrigeration.

(c) Syphilis serology department.

Office.
Laboratory: Section of room separated by partitions for centrifuges and preparation of specimens.

(d) Chemistry department.

Office.
Laboratory: Facilities for water, food, drug, toxicology, and/or industrial hygiene analyses.
Instrument room: Facilities for darkening.

¹ Desirable but not mandatory.

(e) Research and investigation.

Laboratory: Complete laboratory facilities within unit.

(f) Biologicals department.

Adequate refrigeration.
Deep freeze unit.
Room temperature storage.

(g) Central services.

Culture media and reagent preparation room.
Glassware cleaning room.
Acid cleaning unit.
Sterilizing room for culture media and clean glassware only.
Supply room for storage and issue of sterile supplies, general supplies, chemicals, and glassware. Adjacent to sterilizing and glassware cleaning room.
Bulk storage room.
Janitor service room.
Maintenance and utilities unit: Provisions for metal and woodwork, and glassblowing.
Incinerator (animal).
Animal quarters:
Animal rooms.
Room for cleaning and sterilizing cages.
Preparation room for food and bedding.
Operating and animal inoculation room.

(h) Facilities for personnel.

Men's locker room with washroom and shower.
Women's locker room with washroom and shower.
Rest room.
Lunch room.
Staff toilets.

(i) Additional facilities. If the following activities are included, minimum requirements will be as follows:

Consultation and evaluation service to local laboratories:
Office.
Laboratory.
Manufacture of biologicals: This department, including Blood and Blood Products, shall be adequately isolated from the other laboratories. In the case of smallpox and tetanus vaccine preparation separation may be satisfactory in the same building if a separate entrance

is provided and no interior connection exists to this department. A separate mechanical ventilating system must be provided.

Office.

Laboratory: Cubicles for isolation work.

Culture media room.

Sterile room.

Sterilizing room.

Glasswashing room.

Adequate refrigeration.

Deep freeze unit.

Storage room, controlled temperature.

Packaging room.

Blood and blood products:

Laboratory: Space and equipment for processing.

Sterile room.

Office (may be shared with biologicals department).

Adequate refrigeration (may be shared with biologicals department).

Storage room (may be shared with biologicals department).

Pathology department: Laboratory.

Clinical laboratory department: Laboratory.

Virology department: This department shall be efficiently isolated from other laboratories including a separate mechanical ventilating system:

Office.

Laboratory: Cubicles for isolation work.

Sterile room.

Sterilizing room.

Inoculation and operating room.

Animal quarters:

Facilities for storage of food and bedding.

Cleaning and sterilizing of cages.

Locker room with washroom and shower.

Details

Provide separate air conditioning or ventilation system for bacteriological and virus laboratories with ample supply and exhaust to function properly with closed windows. Emergency showers shall be provided in chemical laboratories. Each chemical laboratory room shall have a minimum of two exits. All windows must be screened.

Finishes

Floors:

Resilient, smooth and stain resistant: All laboratories other than chemistry laboratories.

Resilient, smooth and acid resistant: Chemistry laboratories.

Smooth, waterproof, grease-proof, easily cleaned, non-slip, resistant to heavy traffic:

Culture media rooms.
Glasswashing rooms.
Sterilization rooms.
Acid cleaning rooms.
Animal rooms.

Walls:

Waterproof, painted, glazed or similar finishes to a point above the splash or spray line. They shall be without cracks, and in conjunction with floors shall be waterproof and free of cracks and spaces which may harbor ants and roaches:

Laboratories.
Incubator rooms.
Sterilizing rooms.
Culture media rooms.
Glasswashing rooms.
Acid cleaning rooms.

Inoculation and operating rooms.

Animal rooms.

Same as above, but finish to reach to ceiling:

Sterile rooms.

Ceilings: Waterproof painted: Sterile rooms.
Shelves and cabinets: Shelves and cabinets which are used for the storage of food, dishes and cooking utensils shall be so constructed and mounted that there shall be no openings or spaces which cannot be cleaned and which might harbor vermin or insects. Cabinets which are used for the storage of open food containers and dishes shall be dust tight.

Emergency quick acting cold water showers are required at convenient points in chemical laboratories.

Only one system of hot water will be required in laboratories.

Emergency lighting and call systems will not be required in laboratories, except as provided for by local and State codes.

Spare boiler may not be required.

13 DIAGNOSTIC OR TREATMENT CENTER

NOTE: Except as noted herein, requirements for details and finishes, elevators, construction (including fire-resistance), mechanical systems, and electrical systems shall be the same as those for long-term care facilities. (See secs. 9-14, 9-15, 9-16, 9-17, and 9-18.)

(a) General. (1) The extent of the diagnostic, treatment, and ancillary facilities will be determined by the services contemplated and the estimated patient load.

(2) Where the facility is to be an integral part of a hospital, the requirements of adjunct diagnostic and treatment facilities and outpatient department of general hospital, shall apply.

(3) Where a diagnostic or treatment center is not to be an integral part of a hospital, then the facilities listed below must be provided unless available for convenient use in an associated health facility.

(4) The planning of diagnostic or treatment centers should provide for the privacy of the patient during interview, examination, and treatment.

(b) Administration facilities.

Administrative, business, and receptionist space.
Medical records space.
Waiting space.
Public telephone.

(c) Diagnostic facilities. (In certain types of specialized projects, such as mental health clinics, the need for radiological and laboratory facilities will be determined by the services contemplated.)

Radiographic room with adjoining dark room.

Utility and sterilizing facilities.

Laboratory.

(d) Diagnostic and treatment facilities. If medical examination and/or treatment are to be included the following shall be added:

Consultation, examination and treatment space is required by the services contemplated.

(e) Service facilities.

Storage.

Janitor's closet.

Employees' locker facilities.

Toilet facilities.

Boiler room.

Incinerator.
Accessible parking space.¹

Width of corridors shall be not less than 5'0".
Greater width preferred. Windows of examina-

tion and treatment rooms shall be glazed with obscure glass to insure privacy.¹
Emergency lighting and call systems will not be required in diagnostic or treatment facilities except as provided for by local and State codes.
Spare boiler may not be required.

REHABILITATION FACILITIES

NOTE: The following requirements for details and finishes shall be applicable to all types of rehabilitation facilities.

Details

Space allowances: Space allowances shall be consistent with the need in areas used by patients using crutches, wheelchairs or wheel stretchers.

Doors: All doors through which patients will pass shall be at least 3 feet 8 inches wide. Doors at least 3 feet wide will be permitted at individual toilets adjacent to patients' bedrooms.

Corridors: Corridors used by patients shall be at least 8 feet wide. A greater width should be provided at elevator entrances.

Handrails: Handrails will be required on both sides of corridors used by patients in chronic disease hospitals and nursing homes. Handrails are not required in corridors of rehabilitation facilities.

Thresholds: Thresholds at doorways shall be flush.

Telephone alcoves: Telephone alcoves shall be a minimum of 4 feet square. Phone shall be located on a shelf convenient for patients in wheelchairs. Doors to telephone booths are not recommended.

Drinking fountains: Drinking fountains shall be located in corridors of nursing units and treatment areas and lobby. The fountain shall be accessible to patients in wheelchairs.

Brackets: In rehabilitation facilities brackets should be provided adjacent to patients' beds for braces and crutches.

Water closet stalls: Water closet stalls for patient use shall have handrails on both sides. Curtains are recommended in lieu of doors to stalls.

Toilet rooms: Toilet rooms adjacent to patients' rooms shall permit movement of wheelchairs and shall have handrails on both sides.

Hardware: Hardware on water closet enclosures shall be operable from outside.

Lavatories: The front edge of the lavatory for patient use shall be set not less than 22 inches from the wall to which it is attached.¹ They shall be supported on brackets to allow wheelchairs to slide under.

Mirrors: Mirrors shall be arranged for the convenience of patients in wheelchairs as well as patients in a standing position.

Bathtubs: Bathtubs shall not be elevated in rehabilitation facilities. It is recommended that bathtubs shall not be elevated in chronic disease hospitals and nursing homes. Handrails shall be provided at all bathtubs.

Showers: Showers should be approximately 4 feet square and should have handrails and curtains. Curbs shall be omitted.

Finishes

Wainscot: A wainscot of durable material should be provided in all rooms used by patients for

¹ Desirable but not mandatory.

protection of walls against damage caused by wheelchairs, stretchers and carts. Such a wainscot is desirable but not mandatory in chronic disease hospitals and nursing homes. A spare boiler may not be required for rehabilitation facilities. Incinerators are recommended in rehabilitation facilities. Plumbing fixtures which require hot water and

which are accessible to patients shall be supplied with water which is thermostatically controlled to provide a maximum water temperature of 110°F. at the fixture.

Emergency lighting and call systems will not be required in separate rehabilitation facilities for outpatients only except as provided for by local and State codes.

14 REHABILITATION FACILITY (General)

NOTE: Except as noted herein, requirements for details and finishes, elevators, construction (including fire-resistance), mechanical systems, and electrical systems shall be the same as those for long-term care facilities. (See secs. 9-14, 9-15, 9-16, 9-17, and 9-18.)

(a) Wherever possible rehabilitation facilities should be located on the ground floor. The evaluation and treatment facilities should be grouped to facilitate integration of the program and located for convenient access by inpatients and outpatients.

(b) In determining the size of facilities for inpatient and outpatient services, it should be considered that the outpatient load is usually much larger than the inpatient load.

15 REHABILITATION FACILITIES (Multiple Disability) IN A HOSPITAL

NOTE: Except as noted herein, requirements for details and finishes, elevators, construction (including fire-resistance), mechanical systems, and electrical systems shall be the same as those for long-term care facilities. (See secs. 9-14, 9-15, 9-16, 9-17, and 9-18.)

The facilities listed in this section which are in an existing hospital and which are conveniently located and available for use need not be provided.

(a) Administration.

Appointment and cashier's space.
Office for volunteer services coordinator.¹
Lobby and waiting room.
Public telephone booth.
Public toilets.
Personnel toilets.¹

(b) Evaluation and treatment facilities.
Evaluation and treatment facilities shall include medical facilities and, depending upon the program, one or more of the following: psychological, social or vocational, as listed below.

Conference and library room.

Medical facilities:

Offices, examination rooms and work space for medical personnel such as physicians and nurses.

Dental facilities:²

Office and work space for provision of appropriate dental treatment.

Physical therapy:

Office and work space for physical therapy staff.

Rehabilitation gymnasium for adults.

Rehabilitation gymnasium for children if children are included in program.¹

Hydrotherapy area.

Thermotherapy and massage area.

Storage for supplies and equipment.

Outdoor exercise area.¹

Occupational therapy:

Office and work space for occupational therapy staff.

¹ Desirable but not mandatory.

² If required by program.

Therapy area:

In large units space should be divided for diversified work (separate room for children is desirable).

Storage space for supplies and equipment.

Facilities for teaching activities of daily living.

Speech and hearing facilities:²

Offices for therapists and space for examination and treatment.

Artificial appliance facilities:

Space for fitting and adjustment service.

Psychological facilities:

Office and work for psychological testing evaluation and counseling.

Social service facilities:

Office space for private interview and counseling.

Vocational facilities:

Office and work space for counseling, evaluation, prevocational programs and placement. A prevocational area is not required for facilities exclusively serving children under the age of 12.

Special education:

Schoolroom for children if children are included in program.

General facilities:

Locker, toilet and shower facilities for patients.

Clean and soiled linen facilities.

Locker and toilet facilities for female volunteers.¹

Locker and toilet facilities for male volunteers.¹

(c) Nursing unit for adults.¹

General: It is recommended that this unit be located on the ground floor near the treatment area. Approximately one-fifth of the beds should be in two-bed rooms, the remainder in four-bed rooms. Each patient's room shall have a lavatory. Generous wardrobe space for each patient should be provided in the patients' rooms. A toilet room, with lavatory, accessible from adjoining patients' rooms, is recommended. No patients' room shall be located on any floor which is below grade.

Size of nursing unit:

Not more than 50 beds, 35 to 40 beds recommended.

Minimum patients' room areas:

100 square feet per bed in multi-bed patients' rooms.

Service facilities in each nursing unit for adults:

Nurses' station.

Nurses' toilet.

Utility room.

Examination and treatment room.

Floor pantry.

Solarium: Provide 25 square feet per bed for 75 percent of beds on nursing unit.

Dining room: Provide 25 square feet per bed for 75 percent of beds on nursing unit.

It is recommended that the dining and solarium area be adjacent so that they can be combined into one room for recreational and other group activity purposes.

Toilet facilities:

If centralized toilets are provided, a toilet room for each sex at a ratio of 1 water closet to each 5 beds will be required. One of the water closet enclosures in each toilet room should be at least 5 feet by 6 feet to permit toilet training.

If toilets provided adjacent to patients' rooms are not large enough, a separate training toilet, at least 5 feet by 6 feet, should be provided.

Bedpan facilities.

Bathing facilities.

1 bathroom for each sex.

1 shower to each 8 beds.

1 bathtub.

Stretcher and wheelchair parking space.

Clean linen storage.

Equipment and supply storage.

Janitor's closet.

Telephone alcove (one per floor).

Patients' laundry.¹

(d) Nursing unit for children.¹

General: It is recommended that this unit be located on the ground floor near the treatment area. No patients' room should have more than 4 beds. Provide 2 two-bed rooms in each nursing unit. Each patients' room shall have a lavatory. Generous wardrobe space for each patient should be provided in the patients' room. A toilet room, with lavatory, accessible from adjoining patients' room is recommended. No patients' room shall be located on any floor which is below grade.

Size of nursing unit:

Not more than 30 beds.

¹ Desirable but not mandatory.

² If required by program.

REHABILITATION FACILITIES (Multiple Disability) IN A HOSPITAL

Minimum room areas:

100 square feet per bed in two-bed and four-bed rooms. 80 square feet per bed recommended for crib room if provided.

Service facilities in each nursing unit for children.

Nurses' station.

Nurses' toilet.

Utility room.

Examination and treatment room.

Floor pantry.

Solarium: Provide 25 square feet per bed for 75 percent of beds on nursing unit.

Dining room: Provide 25 square feet per bed for 75 percent of beds on nursing unit.

It is recommended that the dining and solarium area be adjacent so that they can be combined into one room for recreational and other group activity purposes.

Toilet facilities:

If centralized toilets are provided, a toilet room for each sex at a ratio of 1 water closet to each 5 beds will be required. One of the water closet enclosures in each

toilet room should be at least 5 feet by 6 feet to permit toilet training.

If toilets provided adjacent to patients' rooms are not large enough a separate training toilet, at least 5 feet by 6 feet, should be provided.

Bedpan facilities.

Bathing facilities:

1 bathroom for each sex.

1 shower to each 8 beds.

1 bathtub.

Stretcher and wheelchair parking space.

Clean linen storage.

Equipment and supply storage.

Janitor's closet.

Telephone alcove (one per floor).

(e) Service department. In general the same service facilities will be required as those noted under separate rehabilitation facility (multiple disability) for inpatients and outpatients, except that those service facilities which are available in the adjoining hospital need not be duplicated.

16 SEPARATE REHABILITATION FACILITY (Multiple Disability) FOR INPATIENTS AND OUTPATIENTS

NOTE: Except as noted herein, requirements for details and finishes, elevators, construction (including fire-resistance), mechanical systems, and electrical systems shall be the same as those for long-term care facilities. (See secs. 9-14, 9-15, 9-16, 9-17, and 9-18.)

(a) Administration.

Business office with information counter, telephone switchboard and cashier's window.

Administrator's office.

Director of nurses' office.

Office for volunteer services coordinator.¹

Case records room.

Library for staff and patients.

Lobby and waiting room.

Public telephone booth.

Public toilets.

Personnel toilets.

(b) Evaluation and treatment facilities.

Evaluation and treatment facilities shall include medical facilities and, depending upon the pro-

gram, one or more of the following: psychological, social, or vocational, as listed below.

Clinical laboratory.²

Radiology: Radiographic room with adjoining dark room, toilet and office.²

Pharmacy: Drug room with minimum facilities for compounding.²

Conference and library room.

Medical facilities:

Offices, examination rooms and work space for medical personnel such as physicians and nurses.

Dental facilities:² Office and work space for provision of appropriate dental treatment.

Physical therapy:

Office and work space for physical therapy staff.

Rehabilitation gymnasium for adults.

¹ Desirable but not mandatory.

² If required by program.

SEPARATE REHABILITATION FACILITY (Multiple Disability) FOR INPATIENTS AND OUTPATIENTS

Rehabilitation gymnasium for children if children are included in program.¹

Hydrotherapy area.

Thermotherapy and massage area.

Storage for supplies and equipment.

Outdoor exercise area.¹

Occupational therapy:

Office and work space for occupational therapy staff.

Therapy area.

In large units space should be divided for diversified work (separate room for children is desirable).

Storage space for supplies and equipment.

Facilities for teaching activities of daily living.
Speech and hearing facilities: Offices for therapists and space for examination and treatment.²

Artificial appliance facilities: Space for fitting and adjustment service.

Psychological facilities: Office and work space for psychological testing, evaluation and counseling.

Social service facilities: Office space for private interview and counseling.

Vocational facilities:

Office and work space for counseling, evaluation, prevocational programs and placement.

A prevocational area is not required for facilities serving children under the age of 12.

Special education: Schoolroom for children if children are included in program.

General facilities:

Locker, toilet, and shower facilities for patients.

Clean and soiled linen facilities.

(c) Nursing unit for adults.

General: It is recommended that this unit be located on the ground floor near the treatment area. Approximately one-fifth of the beds should be in two-bed rooms, the remainder in four-bed rooms.

Each patients' room shall have a lavatory. Generous wardrobe space for each patient should be provided in the patients' rooms. A toilet room, with lavatory, accessible from adjoining patients' rooms, is recommended. No patients' rooms shall be located on any floor which is below grade.

Size of nursing unit: Not more than 50 beds, 35 to 40 beds recommended.

Minimum patients' room areas: 100 square feet per bed in multi-bed patients' rooms.

Service facilities in each nursing unit for adults:

Nurses' station.

Nurses' toilet.

Utility room.

Examination and treatment room.

Floor pantry.

Solarium: Provide 25 square feet per bed for 75 percent of beds on nursing unit.

Dining room: Provide 25 square feet per bed for 75 percent of beds on nursing unit.

It is recommended that the dining and solarium area be adjacent so that they can be combined into one room for recreational and other group activity purposes.

Toilet facilities:

If centralized toilets are provided, a toilet room for each sex at a ratio of 1 water closet to each 5 beds will be required. One of the water closet enclosures in each toilet room should be at least 5 feet by 6 feet to permit toilet training.

If toilets provided adjacent to patients' rooms are not large enough, a separate training toilet, at least 5 feet by 6 feet, should be provided.

Bedpan facilities.

Bathing facilities:

1 bathroom for each sex.

1 shower to each 8 beds.

1 bathtub.

Stretcher and wheelchair parking space.

Clean linen storage.

Equipment and supply storage.

Janitor's closet.

Telephone alcove (one per floor).

Patients' laundry.¹

(d) Nursing unit for children.²

General: It is recommended that this unit be located on the ground floor near the treatment area. No patients' room should have more than 4 beds. Provide 2 two-bed rooms in each nursing unit. Each patients' room shall have a lavatory. Generous wardrobe space for each patient should be provided in the patients' rooms. A toilet room, with lavatory, accessible from adjoining patients' room is recommended. No patients' room shall be located on any floor which is below grade.

¹ Desirable but not mandatory.

² If required by program.

SEPARATE REHABILITATION FACILITY (Multiple Disability) FOR INPATIENTS AND OUTPATIENTS

Size of nursing unit: Not more than 30 beds.

Minimum patients' room areas: 100 square feet per bed in 2-bed and 4-bed room. 80 square feet per bed recommended for crib room if provided.

Service facilities in each nursing unit for children:

Nurses' station.

Nurses' toilet.

Utility room.

Examination and treatment room.

Floor pantry.

Solarium: Provide 25 square feet per bed for 75 percent of beds on nursing unit.

Dining room: Provide 25 square feet per bed for 75 percent of beds on nursing unit.

It is recommended that the dining and solarium areas be adjacent so that they can be combined into one room for recreational and other group activity purposes.

Toilet facilities:

If centralized toilets are provided, a toilet room for each sex at a ratio of 1 water closet to each 5 beds will be required. One of the water closet enclosures in each toilet room should be at least 5 feet by 6 feet to permit toilet training.

If toilets provided adjacent to patients' rooms are not large enough, a separate training toilet, at least 5 feet by 6 feet, should be provided.

Bedpan facilities.

Bathing facilities:

1 bathroom for each sex.

1 shower to each 8 beds.

1 bathtub.

Stretcher and wheelchair parking space.

Clean linen storage.

Equipment and supply storage.

Janitor's closet.

Telephone alcove (one per floor).

(e) Service department.

Central sterilizing and supply room.

Dietary facilities:

Main kitchen.

Dietitians' space.

Dishwashing room.

Adequate refrigeration.

Garbage disposal facilities.

Day storage room.

Personnel dining space. Provide 12 square feet per person; may be designed for multiple seatings.

Outpatients' dining facilities as required.

Janitor's closet.

Housekeeping facilities:

Laundry; unless commercial or other laundry facilities are available, each rehabilitation facility shall have a laundry of sufficient capacity to process full 7 days' laundry in work week and contain the following areas:

Sorting area.

Processing area.

Clean linen and sewing room separate from laundry.

Where no laundry is provided in the hospital, a soiled linen room and a clean linen and sewing room shall be provided.

Housekeeper's office.

Mechanical facilities:

Boiler and pump room.

Shower and locker facilities.²

Engineers' space.

Maintenance shops: At least one room shall be provided. In large rehabilitation facilities, separation of carpentry, painting and plumbing is recommended.

Employees' facilities:

Female staff and volunteers lockers:

Locker room.

Rest room.

Toilet and shower room.

Female help lockers:

Locker room.

Rest room.

Toilet and shower room.

Male staff and volunteers lockers:

Locker room.

Toilet and shower room.

Male help lockers:

Locker room.

Toilet and shower room.

Storage:

General storage. 20 square feet per bed and to be concentrated in one area.

Storage of out-door equipment.¹

¹ Desirable but not mandatory.

² If required by program.

17 SEPARATE REHABILITATION FACILITY (Multiple Disability) FOR OUTPATIENTS ONLY

NOTE: Except as noted herein, requirements for details and finishes, elevators, construction (including fire-resistance), mechanical systems, and electrical systems shall be the same as those for long-term care facilities. (See secs. 9-14, 9-15, 9-16, 9-17, and 9-18.)

(a) Administration.

Business office with information counter, telephone switchboard and cashier's window.
Administrator's office.
Director of nurses' office.
Office for volunteer services coordinator.¹
Case records room.
Library for staff and patients.
Lobby and waiting room.
Public telephone booth.
Public toilets.
Personnel toilets.¹

(b) Evaluation and treatment facilities.

Evaluation and treatment facilities shall include medical facilities and, depending upon the program, one or more of the following: psychological, social or vocational, as listed below.

Conference and library room.

Medical facilities:

Offices, examination rooms and work space for medical personnel such as physicians and nurses.

Dental facilities:² Office and work space for provision of appropriate dental treatment.

Physical therapy:

Office and work space for physical therapy staff.

Rehabilitation gymnasium for adults.

Rehabilitation gymnasium for children if children are included in program.¹

Hydrotherapy area.

Thermotherapy and massage area.

Storage for supplies and equipment.

Outdoor exercise area.¹

Occupational therapy:

Office and work space for occupational therapy staff.

Therapy area: In large units space should be divided for diversified work (separate room for children is desirable).

Storage space for supplies and equipment.

Facilities for teaching activities of daily living.

Speech and hearing facilities:² Offices for therapists and space for examination and treatment.

Artificial appliance facilities: Space for fitting and adjustment service.

Psychological facilities: Office and work space for psychological testing evaluation and counseling.

Social service facilities: Office space for private interview and counseling.

Vocational facilities:

Office and work space for counseling, evaluation, prevocational programs and placement. A prevocational area is not required for facilities exclusively serving children under the age of 12.

Special Education:

Schoolroom for children if children are included in program.

General facilities:

Locker, toilet and shower facilities for patients.

Clean and soiled linen facilities.

(c) Service facilities.

Dietary facilities.²

Housekeeping facilities: Clean and soiled linen storage.

Janitors' closet(s).

Mechanical facilities:

Boiler room.

Maintenance shop.

Employees' facilities:

Female staff and volunteers lockers:

Locker room.

Rest room.

Toilet and shower room.

Female help lockers:

Locker room.

Rest room.

Toilet and shower room.

¹ Desirable but not mandatory.

² If required by program.

*SEPARATE REHABILITATION FACILITY (Multiple
Disability) FOR OUTPATIENTS ONLY*

Male staff and volunteers lockers:

Locker room.

Toilet and shower room.

Male help lockers.

Locker room.

Toilet and shower room.

Storage:

General storage.

18 SINGLE DISABILITY REHABILITATION FACILITY

NOTE: Except as noted herein, requirements for details and finishes, elevators, construction (including fire-resistance), mechanical systems, and electrical systems shall be the same as those for long-term care facilities: (See secs. 9-14, 9-15, 9-16, 9-17, and 9-18.)

The requirements for a single disability rehabilitation facility will be dependent upon the specific project program, which shall include, however, services in the four basic areas--medical, psychological, social and vocational. In general

the single disability rehabilitation facility will follow the pattern established for the multiple disability rehabilitation facility. In other respects the general standards set forth herein shall apply.

$$0 \leq \theta \leq \pi, \quad \theta \neq \frac{\pi}{2}, \quad \theta \neq \frac{3\pi}{2}$$

$$\begin{aligned} \frac{1}{\rho} \frac{d\rho}{dt} &= \frac{1}{\rho} \frac{d}{dt} \left(\frac{1}{\rho} \frac{d\rho}{dt} \right) = \frac{1}{\rho} \left(\frac{1}{\rho} \frac{d^2\rho}{dt^2} - \frac{1}{\rho^2} \left(\frac{d\rho}{dt} \right)^2 \right) \\ &= \frac{1}{\rho} \left(\frac{1}{\rho} \frac{d^2\rho}{dt^2} - \frac{1}{\rho^2} \left(\frac{d\rho}{dt} \right)^2 \right) = \frac{1}{\rho^2} \left(\frac{d^2\rho}{dt^2} - \frac{1}{\rho} \left(\frac{d\rho}{dt} \right)^2 \right) \end{aligned}$$

$$\begin{aligned} \frac{1}{\rho} \frac{d\rho}{dt} &= \frac{1}{\rho} \frac{d}{dt} \left(\frac{1}{\rho} \frac{d\rho}{dt} \right) = \frac{1}{\rho} \left(\frac{1}{\rho} \frac{d^2\rho}{dt^2} - \frac{1}{\rho^2} \left(\frac{d\rho}{dt} \right)^2 \right) \\ &= \frac{1}{\rho} \left(\frac{1}{\rho} \frac{d^2\rho}{dt^2} - \frac{1}{\rho^2} \left(\frac{d\rho}{dt} \right)^2 \right) = \frac{1}{\rho^2} \left(\frac{d^2\rho}{dt^2} - \frac{1}{\rho} \left(\frac{d\rho}{dt} \right)^2 \right) \end{aligned}$$

$$\frac{1}{\rho} \frac{d\rho}{dt} = \frac{1}{\rho} \frac{d}{dt} \left(\frac{1}{\rho} \frac{d\rho}{dt} \right) = \frac{1}{\rho} \left(\frac{1}{\rho} \frac{d^2\rho}{dt^2} - \frac{1}{\rho^2} \left(\frac{d\rho}{dt} \right)^2 \right)$$

$$\frac{1}{\rho} \frac{d\rho}{dt} = \frac{1}{\rho} \frac{d}{dt} \left(\frac{1}{\rho} \frac{d\rho}{dt} \right)$$